Phytoplankton Productivity in the Eastern Canadian Arctic during July and August 1980

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Les numéros 1 à 25 de cette série ont été publiés à titre de Records statistiques, Service des pêches et de la mer. Les numéros 26-160 ont été publiés à titre de Rapports statistiques du Service des pêches et de la mer, Ministère des Pêches et de l'Environnement. Le nom de la série a été modifié à partir du numéro 161.

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Canadian Data Report

Fisheries and Aquatic Sciences No. 386

PHYTOPLANKTON PRODUCTIVITY IN THE EASTERN CANADIAN ARCTIC DURING JULY AND AUGUST 1980

by

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ABSTRACT

Irwin, B., L. Harris, P. Dickie, P. Lindley and T. Platt. 1983.
Phytoplankton productivity in the Eastern Canadian Arctic during
July and August 1980. Can. Data Rept. Aquat. Sci. No. 386: 157 p.

During the period of 14 July to 29 August 1980, a series of primary productivity experiments were conducted on board CSS Hudson in the Labrador Sea, Davis Strait, Baffin Bay, Lancaster Sound, Jones Sound and Kane Basin. In this report we make available the raw data and also the fitted light saturation parameters.

RÉSUMÉ

Irwin, B., L. Harris, P. Dickie, P. Lindley and T. Platt. 1983.
Phytoplankton productivity in the Eastern Canadian Arctic during
July and August 1980. Can. Data. Rept. Aquat. Sci. No. 386: 157 p.

Pendant la période du 14 Juillet au 29 Août, 1980 une série d'expériences de productivité primaire one été effectuées à bord du CSS Hudson dans la mer Labrador, au détroit de Davis, de la baie de Baffin, au détroit de Lancaster, au détroit de Jones et au bassin de Kane. Dans ce rapport nous presentons les données bruts sur ces expériences, ainsi que les paramètres qui furent calculés pour representer les courbes de production en fonction de la lumière.

INTRODUCTION

This is the sixth in a series of data reports giving the results of experiments on photosynthetic production versus light intensity for natural phytoplankton populations in the North Atlantic and adjacent waters north of 50°N. Samples were collected from CSS Hudson from 14 July to 29 August 1980. From 14 July to 23 July this was a joint cruise with the Ocean Circulation Division, Ocean and Aquatic Sciences and from 24 July to 10 August a joint cruise with the Metrology Division, Ocean and Aquatic Sciences.

SAMPLING

Water samples were collected with 30 ℓ Niskin bottles or off the surface with a plastic bucket. Rates of assimilation of ^{14}C by phytoplankton were measured as a function of light intensity in artifical light incubators. At 15 stations samples from a single depth were run at 4 different temperatures covering a range on either side of in situ temperature. At 10 other stations samples were collected from three depths. Each sample was incubated at the in situ temperature.

At two stations samples were collected from the same depths with 30 ℓ Niskins and a high volume pump to test for possible differences between sampling methods. At one station samples were collected off the surface adjacent to a heavily populated bird colony and some 2 miles distant to look for effects of possible nutrient enrichment.

METHODS

Productivity

Primary productivity was measured using the ^{14}C method as described in Strickland and Parsons (1972). For each light saturation experiment

50 ml of sodium bicarbonate was mixed with 5 ℓ of water to yield an approximate activity of 5 µci per 100 ml of sample. Each of 43 light and 2 dark bottles was filled with 100 ml aliquot of innoculated sample water and placed in a temperature controlled incubator. Illumination in the incubators was provided by a 2000 W tungsten-halogen lamp (New Haline OHS 2000) having a maximum intensity of approximately 1000 W m^{-2} PAR.

Temperature control in the incubators was achieved by pumping water from a temperature controlled bath and circulator (Forma Scientific Model 2160). Temperatures were matched to _in situ_ temperatures except in experiments where the effects of temperature on assimilation number was being investigated. In these experiments a range of temperatures was chosen - usually +4° to -4° from _in situ_ temperature.

From July 14 to July 17, lights were switched on in the incubators immediately after all bottles were installed. From July 18 onwards in all experiments where temperature effects were being investigated, bottles were kept in the dark at experimental temperatures for 1 hour before lights were switched on. Incubations were terminated after 2 hours for all experiments.

All samples were filtered onto Whatman GF/C glass fibre filters. Most filters were immediately dried, fumed with HCl and counted in a liquid scintillation counter. The remainder were stored at -20°C for later analysis.

Chlorophyll a

Replicate 1 liter samples were filtered onto 5.5 cm Whatman GF/C glass fibre filters. Filters were placed in vials containing 10 mls of 85% acetone and chlorophyll was extracted at 0°C in the dark for 24 hours. The fluorometric technique of Yentsch and Menzel (1963) as modified by Holm-Hansen et al. (1965) was used to estimate chlorophyll and phaeophytin concentrations.

Incubation light intensity

Photosynthetically active radiation (PAR) was measured in each bottle position using a Licor Li 185A quantum meter fitted with a 190S underwater quantum sensor.

Incident light

Total incident light was measured with an Eppley 40 junction black and white pyranometer. The output from the pyranometer was integrated hourly using a Licor 550 printing integrator. Incident PAR was measured using a Licor Li 190s quantum sensor and similarily integrated.

Nutrients

Five inorganic nutrients were routinely measured from each sample. All analysis were carried out on board the ship within a few hours of collection. Inorganic phosphate, silicate and nitrate were measured on a Technicon II autoanalyser using industrial methods 155-71W, 186-72W and 158-71W respectively. Ammonia was measured by the phenolhypochlorite method of Solorzano (1969) and urea concentrations by the urease method of McCarthy (1970).

Organic particulates

Nucleic acids, protein, adenosine triphosphate, particulate carbon and nitrogen concentrations were measured using methods described in Irwin et al. (1982).

Estimation of photosynthetic parameters

Measurements of specific production, P^B, and irradiance, I, were used to estimate parameters in the equation of Platt et al. 1981,

$$P^B = P_s\,(1 - e^{-\alpha I/Ps})\,e^{-\beta I/Ps}$$

P_s (mg C mg Chl^{-1} h^{-1}) is the light saturated rate of specific production in the absence of photoinhibition, α (mg C (mg $\mathrm{Chl})^{-1}$ h^{-1} W^{-1} m^{-2}) is the initial slope of the PI curve and β (same units as α) is a parameter that characterises photoinhibition. Complete details of the fitting routine are given in Irwin et al. (1982) and a discussion of the mathematical basis for this technique is in Irwin et al. (1980).

ACKNOWLEDGEMENTS

We wish to thank Dave Rudderham for his assistance in calculation of the light saturation parameters and Carla Caverhill for the computer programme which prepared the data tables.

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Light Saturation Data and Related Biomass and Nutrient Measurements

NO PAGE 6 + 8

Units

P = mg C $m^{-3}h^{-1}$(mg Chl)$^{-1}$

I = W m^{-2}

P_s = mg C mg Chl$^{-1}h^{-1}$

α = mg C(mg Chl)$^{-1}h^{-1}W^{-1}m^{-2}$

β = mg C(mg Chl)$^{-1}h^{-1}W^{-1}m^{-2}$

Organic particulate concentrations are in mg m^{-3} and nutrients are in mg at m^{-3}. The 90% confidence interval for P_s, α and β are shown in the closed brackets below the estimates for each parameter.

NO PAGE 10

```
                         EASTERN ARCTIC 1980

LAT 44 26.90'N      LONG 63 02.40'W       DATE 14 07 80    DEPTH  11M
----------------------------------------------------------------------
   I          P        I          P        I          P        I          P
----------------------------------------------------------------------

 492.4      3.97    423.2      1.86    308.9      2.18    296.2      2.75
 297.0      2.32    220.1      2.17    215.8      2.22    165.1      2.43
 156.6      2.13    143.9      2.08    120.6      1.70    119.4      2.31
  89.7      2.05     74.1      1.89     63.1      1.96     53.4      1.93
  47.4      1.78     40.7      2.82     39.0      1.26     28.0      1.19
  27.5      1.22     21.2      1.16     19.9       .76     12.5       .46
  12.3       .43      9.5       .27      8.7       .30      6.6       .24
   6.6       .19      4.9       .13      4.1       .14      3.0       .05
   2.9       .06      2.4       .04      2.3       .07      2.0       .00
   2.0       .02      1.9       .41      1.2       .00      1.0       .01
   1.0       .08


                          PARAMETER VALUES

      PS :      2.41          ALPHA :     .061          BETA :    .0000

     ( 2.09,   2.73 )       ( .051, .071 )          ( -.0011,  .0011 )

 SAMPLE TEMPERATURE  11.5 C               INCUBATION TEMPERATURE  9.0  C


 CHLOROPHYLL :      .48       RNA     :    7.88       PHOSPHATE   :     -

 CARBON      :  109.00        DNA     :    4.88       NITRATE     :     -

 NITROGEN    :   15.00        ATP     :     .42       SILICATE    :     -

 PROTEIN     :  124.00        UREA    :     .00       AMMONIA     :    .76
```

EASTERN ARCTIC 1980

LAT 47 17.20'N LONG 59 27.00'W DATE 15 07 80 DEPTH 50M

I	P	I	P	I	P	I	P
856.8	.34	846.3	.20	793.4	.30	782.8	.21
708.7	.43	698.2	.46	655.9	.51	655.9	.31
592.4	.70	550.1	.58	465.4	.59	433.7	.82
359.7	1.01	359.7	.87	258.1	.95	247.5	1.09
190.4	1.32	158.7	1.10	118.5	1.28	97.3	1.32
76.2	1.28	67.7	1.32	55.0	1.39	48.7	1.25
42.3	1.45	31.7	1.47	26.7	1.35	22.8	1.17
16.5	1.04	14.4	.99	11.4	.77	9.7	.87
8.5	.60	6.8	.62	5.5	.16	4.2	.31
3.4	.48	3.0	.41	2.5	.35	2.1	.31
1.7	.33	1.7	.28				

PARAMETER VALUES

PS :	1.60	ALPHA :	.110	BETA :	.0030
	(1.54, 1.65)		(.102, .118)		(.0026, .0033)

SAMPLE TEMPERATURE 3.0 C INCUBATION TEMPERATURE 5.0 C

CHLOROPHYLL :	.22	RNA :	5.26	PHOSPHATE :	.83
CARBON :	85.00	DNA :	3.96	NITRATE :	3.57
NITROGEN :	-	ATP :	-	SILICATE :	1.47
PROTEIN :	42.70	UREA :	.70	AMMONIA :	1.36

EASTERN ARCTIC 1980

LAT 47 17.20'N LONG 59 27.00'W DATE 15 07 80 DEPTH 50M

I	P	I	P	I	P	I	P
804.0	.12	782.9	.53	687.7	.10	613.6	.50
529.0	.29	518.4	.45	454.9	.69	423.2	.24
397.8	.82	319.5	.84	262.4	.52	245.5	1.06
201.1	1.35	173.6	.90	160.9	1.01	114.3	1.37
95.3	1.65	74.1	1.82	44.5	1.45	36.1	1.28
28.0	1.03	23.4	.66	17.4	.62	14.9	.49
13.2	.50	11.5	.40	9.4	.42	8.1	.32
6.4	.22	6.0	.16	3.9	.16	3.9	.26
3.0	.10	2.6	.07	2.2	.15	2.2	.09
1.8	.03	1.4	.03				

PARAMETER VALUES

PS :	2.20	ALPHA :	.053	BETA :	.0072
	(1.91, 2.49)		(.047, .059)		(.0052, .0092)

SAMPLE TEMPERATURE 3.0 C

INCUBATION TEMPERATURE 7.0 C

CHLOROPHYLL :	.22	RNA :	5.26	PHOSPHATE :	.83
CARBON :	85.00	DNA :	3.96	NITRATE :	3.57
NITROGEN :	-	ATP :	-	SILICATE :	1.47
PROTEIN :	42.70	UREA :	.70	AMMONIA :	1.36

```
                                  EASTERN ARCTIC 1980

 LAT 49 07.70'N       LONG 59 14.20'W         DATE 15 07 80    DEPTH   6M
-------------------------------------------------------------------------------------
    I            P          I            P          I            P          I            P
-------------------------------------------------------------------------------------

 925.1          .28      732.0          .49      710.9          .90      613.5          .60
 592.4         1.21      588.2          .65      550.1         1.02      465.4         1.12
 465.4         1.36      452.7         1.20      372.4         1.37      368.1         1.53
 347.0         1.18      275.0         1.39      258.1         1.40      232.7         1.08
 165.0         1.36      154.4         1.25      103.7         1.42       95.2         1.16
  72.8         1.39       58.0         1.23       46.5         1.26       44.4         1.24
  36.8          .97       31.3          .93       28.4          .54       19.5          .62
  17.3          .33       13.5          .38       12.7          .19       10.5          .23
  10.0          .17        7.4          .16        7.0          .07        4.6          .06
   4.6          .04        3.3          .04        3.2          .02        2.3          .02
   2.0          .01        2.0          .00        1.5          .00

                                  PARAMETER VALUES

        PS :      2.00             ALPHA :       .033               BETA :    .0028

       ( 1.78,   2.23 )           ( .030, .037 )                 (  .0020,   .0036 )

   SAMPLE TEMPERATURE  11.0 C                 INCUBATION TEMPERATURE  12.0 C


  CHLOROPHYLL :        .58        RNA      :     7.75        PHOSPHATE    :       .33

  CARBON      :     125.00        DNA      :     4.92        NITRATE      :       .08

  NITROGEN    :      20.00        ATP      :      .46        SILICATE     :       .61

  PROTEIN     :      80.60        UREA     :      .00        AMMONIA      :       .24
```

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                         EASTERN ARCTIC 1980

 LAT 48 07.70'N      LONG 59 14.20'W       DATE 15 07 80    DEPTH   6M
-------------------------------------------------------------------------
    I          P        I         P         I         P        I          P
-------------------------------------------------------------------------

 829.3       2.24     787.0      2.21     740.5      2.23     736.2      2.12
 655.9       2.70     609.3      2.62     571.2      2.33     499.3      2.92
 490.8       2.57     402.0      2.24     380.8      2.73     323.7      2.86
 285.6       2.67     279.3      2.71     217.9      2.70     192.5      2.60
 139.6       2.50     124.8      2.39      87.6      2.56      85.5      2.48
  62.2       1.98      57.1      2.07      45.3      1.61      40.6      1.61
  30.9       1.21      28.8      1.06      19.5       .63      16.9       .65
  13.1        .41      13.1       .44       9.9       .23       9.4       .25
   7.4        .13       7.3       .13       4.5       .10       4.1       .05
   3.2        .07       3.2       .06       2.2       .04       2.2       .01
   1.6        .02       1.6       .00

                           PARAMETER VALUES

        PS :      3.10          ALPHA :      .050          BETA :     .0012

       ( 2.96,   3.25 )         ( .047, .053 )          (  .0009,  .0016 )

  SAMPLE TEMPERATURE  11.0 C              INCUBATION TEMPERATURE  5.5  C


  CHLOROPHYLL :       .58         RNA    :     7.75        PHOSPHATE   :      .33

  CARBON      :    125.00         DNA    :     4.92        NITRATE     :      .08

  NITROGEN    :     20.00         ATP    :      .46        SILICATE    :      .61

  PROTEIN     :     80.60         UREA   :      .00        AMMONIA     :      .24
```

```
                         EASTERN ARCTIC 1980

LAT 48 07.70'N        LONG 59 14.20'W        DATE 15 07 80     DEPTH    6M
---------------------------------------------------------------------------
    I         P         I         P         I         P         I         P
---------------------------------------------------------------------------

778.6        .90    732.0       .95    655.9       .77    562.8       1.39
537.4       1.08    431.6      1.36    376.6      1.41    376.6       1.51
342.7       1.61    258.1      1.63    207.3      1.52    186.2       1.51
162.9       1.60    154.4      1.41    118.5      1.56     97.3       1.47
 78.7       1.64     74.9      1.81     60.1      1.37     55.0       1.32
 43.6       1.22     34.7      1.03     33.0      1.02     27.1        .75
 23.7        .82     18.2       .48     16.1       .55     11.6        .29
 10.8        .29      7.8       .20      7.7       .19      5.7        .08
  5.3        .13      3.5       .04      3.3       .03      2.9        .02
  2.5        .00      1.8       .00      1.6       .04      1.4        .00
  1.4        .00


                          PARAMETER VALUES

       PS :     2.04           ALPHA :      .041          BETA :    .0021

     ( 1.92,    2.16 )        ( .038,  .043 )          (  .0017,  .0025 )

  SAMPLE TEMPERATURE  11.0 C              INCUBATION TEMPERATURE  7.5  C


 CHLOROPHYLL :      .58      RNA     :     7.75      PHOSPHATE    :      .33

 CARBON      :   125.00      DNA     :     4.92      NITRATE      :      .08

 NITROGEN         20.00      ATP     :      .46      SILICATE     :      .61

 PROTEIN     :    80.60      UREA    :      .00      AMMONIA      :      .24
```

```
                              EASTERN ARCTIC 1980

 LAT 50 42.80'N       LONG 57 44.60'W        DATE 16 07 80     DEPTH   8M
------------------------------------------------------------------------------
   I          P          I          P          I          P         I          P
------------------------------------------------------------------------------

 946.3       2.76      793.4       4.14      719.3       5.54     698.2       3.54
 624.2       5.31      571.2       6.79      558.5       6.83     497.2       6.57
 444.3       7.02      414.7       6.91      408.3       6.59     304.7       7.42
 292.0       6.81      279.3       6.80      218.3       7.27     217.9       6.66
 135.4       6.98      131.2       6.89       86.7       6.62      82.5       6.70
  59.2       6.62       50.8       6.04       40.2       6.04      36.0       5.39
  33.9       4.98       27.1       4.06       22.4       4.75      14.4       2.47
  14.0       3.03       10.4       1.68       10.0       1.88       7.9        .89
   7.3       1.15        6.1        .66        5.6        .77       3.5        .14
   3.4        .23        2.6        .07        2.5        .08       1.9        .00
   1.9        .00        1.4        .00        1.4        .00

                              PARAMETER VALUES

       PS :      8.71        ALPHA :      .217          BETA :     .0068

      ( 8.22,   9.20 )      ( .200, .233 )          (  .0053,   .0082 )

  SAMPLE TEMPERATURE  10.5 C              INCUBATION TEMPERATURE  11.5 C


  CHLOROPHYLL :      .26       RNA     :     5.40      PHOSPHATE   :      .18

  CARBON      :    43.00       DNA     :     4.08      NITRATE     :      .15

  NITROGEN    :     8.00       ATP     :      .45      SILICATE    :     1.31

  PROTEIN     :    81.40       UREA    :      .00      AMMONIA     :      .34
```

```
                              EASTERN ARCTIC 1980

 LAT 50 42.80'N       LONG 57 44.60'W         DATE 16 07 80     DEPTH   8M
-----------------------------------------------------------------------------------
     I           P          I          P          I          P          I          P
-----------------------------------------------------------------------------------

 825.1        2.28      803.9       1.50      719.3       1.23      698.2       1.90
 668.5        1.89      575.5       3.97      571.2       3.02      524.7       3.08
 461.2        3.81      431.6       4.40      359.7       4.73      359.7       3.47
 304.7        4.37      220.0       4.74      213.7       4.17      211.6       4.19
 148.1        4.76      129.1       4.35       99.4       4.16       98.2       4.42
  67.7        3.95       61.4       4.21       46.5       4.40       44.4       3.71
  36.4        4.29       31.7       3.35       27.1       3.57       18.2       2.53
  15.7        2.57       12.1       1.83       12.1       1.69        9.1       1.48
   9.0        2.23        6.5       1.06        6.3       1.23        4.3        .85
   3.9         .71        2.9        .60        2.7        .56        2.2        .48
   2.0         .53        1.6        .46        1.5        .39

                                PARAMETER VALUES

            PS :     5.42          ALPHA :     .198           BETA :    .0060

          (  5.12,   5.72 )        ( .180, .216 )          (   .0049,   .0070 )

   SAMPLE TEMPERATURE  10.5 C               INCUBATION TEMPERATURE  5.5  C


  CHLOROPHYLL :      .26       RNA      :     5.40      PHOSPHATE    :      .18

  CARBON      :    43.00       DNA      :     4.08      NITRATE      :      .15

  NITROGEN    :     8.00       ATP      :      .45      SILICATE     :     1.31

  PROTEIN     :    81.40       UREA     :      .00      AMMONIA      :      .34
```

```
                           EASTERN ARCTIC 1980

 LAT 50 42.80'N      LONG 57 44.60'W       DATE 16 07 80    DEPTH   8M
-------------------------------------------------------------------------------
    I          P          I          P          I          P          I          P
-------------------------------------------------------------------------------

 770.1       1.71     723.6       1.48     643.2       2.10     592.4       2.57
 516.2       3.99     490.8       2.98     454.9       4.50     380.8       3.94
 363.9       4.79     338.5       4.71     270.8       4.10     245.4       5.14
 201.0       4.71     181.9       4.65     169.3       5.09     150.2       4.50
 110.0       5.04      98.2       4.78      91.0       5.08      69.8       4.20
  64.3       4.75      52.0       4.10      45.3       4.33      34.3       3.61
  33.9       3.41      27.1       3.10      26.2       2.87      15.7       1.74
  14.8       1.83      10.8       1.24      10.7       1.34       8.3        .80
   7.7        .86       6.2        .49       6.0        .55       3.8        .25
   3.4        .31       2.8        .11       2.7        .22       2.0        .17
   1.9        .01       1.4        .00       1.4        .00

                           PARAMETER VALUES

          PS :     6.77          ALPHA :      .140          BETA :    .0100

         (  6.36,  7.19 )        ( .131, .149 )          (  .0083,  .0117 )

  SAMPLE TEMPERATURE  10.5 C                 INCUBATION TEMPERATURE  7.5  C


 CHLOROPHYLL :      .26        RNA     :     5.40        PHOSPHATE    :     .18

 CARBON      :    43.00        DNA     :     4.08        NITRATE      :     .15

 NITROGEN    :     8.00        ATP     :      .45        SILICATE     :    1.31

 PROTEIN     :    81.40        UREA    :      .00        AMMONIA      :     .34
```

```
                          EASTERN ARCTIC 1980

  LAT 50 42.80'N      LONG 57 44.60'W        DATE 16 07 80    DEPTH   8M
------------------------------------------------------------------------------
     I          P          I          P          I          P          I          P
------------------------------------------------------------------------------

  727.8        .45      613.5        .76      571.2       1.09      444.3       1.77
  418.9       1.13      287.7       2.23      279.3       1.28      213.7       2.45
  190.4       1.86      190.4       3.44      139.6       2.75      131.2       3.27
  100.7       2.91       97.3       3.12       72.9       3.44       69.9       3.28
   49.1       3.20       48.7       2.92       38.5       2.78       34.7       2.24
   27.1       2.92       24.1       1.43       21.6       2.10       14.4        .89
   13.5       1.10       10.7        .84       10.4        .57        7.4        .35
    7.3        .68        6.1        .12        5.7        .25        3.6        .14
    3.3        .23        2.7        .05        2.4        .06        1.9        .05
    1.8        .06        1.2        .10


                             PARAMETER VALUES

        PS :     4.86          ALPHA :      .111          BETA :    .0150

       ( 4.24,   5.48 )        ( .100, .121 )           (  .0107,   .0194 )

  SAMPLE TEMPERATURE  10.5 C              INCUBATION TEMPERATURE  1.5  C


  CHLOROPHYLL :      .26      RNA      :     5.40      PHOSPHATE   :      .18

  CARBON      :    43.00      DNA      :     4.08      NITRATE     :      .15

  NITROGEN    :     8.00      ATP      :      .45      SILICATE    :     1.31

  PROTEIN     :    81.40      UREA     :      .00      AMMONIA     :      .34
```

```
                              EASTERN ARCTIC 1980

LAT 51 36.70'N        LONG 56 13.30'W        DATE 16 07 80     DEPTH    6M
------------------------------------------------------------------------------
  I          P          I          P          I          P          I          P
------------------------------------------------------------------------------

812.4       1.18      761.6        .98      710.9       1.29      655.9       1.45
613.5       2.18      600.8       2.03      558.5       2.30      533.1       2.57
414.7       3.04      344.9       2.63      332.2       2.71      292.0       2.86
262.3       3.01      222.1       2.70      171.4       3.23      146.0       2.36
110.9       2.76      108.3       2.97       91.0       2.94       82.5       2.84
 66.4       2.77       59.7       2.50       51.6       2.50       40.6       2.20
 38.9       2.30       29.2       1.76       28.8       1.71       17.3       1.19
 16.9       1.16       12.1        .73       11.7        .79        9.1        .58
  9.1        .51        6.6        .33        6.2        .36        3.7        .19
  3.5        .19        2.7        .11        2.6        .10        2.0        .06
  1.9        .04        1.4        .04        1.4        .06

                              PARAMETER VALUES

        PS :      3.93           ALPHA :      .078             BETA :    .0047

      (  3.68,  4.17 )          ( .073, .084 )             (  .0039,  .0056 )

  SAMPLE TEMPERATURE  6.6   C              INCUBATION TEMPERATURE  9.0   C


  CHLOROPHYLL :    1.26        RNA     :  13.56        PHOSPHATE    :     .19

  CARBON      :   86.00        DNA     :   5.34        NITRATE      :     .15

  NITROGEN    :   13.00        ATP     :   1.05        SILICATE     :    3.31

  PROTEIN     :  303.00        UREA    :    .00        AMMONIA      :     .33
```

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                              EASTERN ARCTIC 1980

LAT 51 36.70'N        LONG 56 13.30'W          DATE 16 07 80      DEPTH    6M
--------------------------------------------------------------------------------
     I             P          I            P          I            P          I            P
--------------------------------------------------------------------------------

825.1          .89       799.7          .54      732.0          .64      723.6          .86
660.1          .93       643.2         1.71      558.5         1.32      486.6         1.76
473.9         1.91       473.9         1.40      410.4         1.61      349.1         2.12
266.6         1.95       262.3         1.98      194.6         2.31      173.5         2.02
135.4         2.23       110.0         1.96       99.4         2.03       76.2         1.99
 67.7         1.98        53.3         1.89       44.4         2.04       39.8         1.60
 35.5         1.91        30.9         1.34       27.5         1.64       17.3          .97
 16.1         1.04        12.7          .64       12.3          .71        8.6          .44
  8.6          .44         6.8          .33        6.6          .31        4.3          .20
  3.9          .14         2.9          .09        2.9          .07        2.2          .04
  2.1          .06         1.5          .03        1.4          .02

                              PARAMETER VALUES

         PS :       2.82           ALPHA :       .069            BETA :     .0038

       ( 2.64,   3.00 )          ( .064, .075 )            (  .0031,  .0045 )

 SAMPLE TEMPERATURE   6.6   C               INCUBATION TEMPERATURE   4.5   C


 CHLOROPHYLL :     1.26        RNA      :    13.56        PHOSPHATE    :      .19

 CARBON      :    86.00        DNA      :     5.34        NITRATE      :      .15

 NITROGEN    :    13.00        ATP      :     1.05        SILICATE     :     3.31

 PROTEIN     :   303.00        UREA     :      .00        AMMONIA      :      .33
```

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                              EASTERN ARCTIC 1980

LAT 51 36.70'N       LONG 56 13.30'W          DATE 16 07 80    DEPTH   6M
--------------------------------------------------------------------------------
   I           P           I          P           I          P          I           P
--------------------------------------------------------------------------------

740.5         .80     664.3        .81     600.8        1.23     596.6         .89
550.1        1.58     473.9       1.25     431.6        1.88     359.7        1.80
304.7        2.16     272.9       1.90     272.9        1.96     228.5        2.04
196.8        2.20     177.7       2.18     148.1        2.10     135.4        2.09
107.9        2.14      86.7       1.93      72.8        2.21      61.4        2.00
 56.3        1.98      41.5       1.65      41.0        1.80      33.4        1.45
 33.0        1.46      24.1       1.13      23.7        1.25      15.2         .70
 14.4         .68      11.3        .55      10.2         .37       7.8         .35
  7.5         .40       5.6        .24       5.3         .23       3.2         .10
  3.0         .14       2.4        .06       2.2         .07       2.0         .06
  2.0         .04


                                PARAMETER VALUES

           PS :      3.00          ALPHA :       .061          BETA :    .0047

          (  2.84,   3.16 )       ( .058, .065 )           (  .0040,  .0054 )

  SAMPLE TEMPERATURE   6.6   C               INCUBATION TEMPERATURE   7.5   C


 CHLOROPHYLL :     1.26        RNA     :    13.56        PHOSPHATE    :      .19

 CARBON      :    86.00        DNA     :     5.34        NITRATE      :      .15

 NITROGEN    :    13.00        ATP     :     1.05        SILICATE     :     3.31

 PROTEIN     :   303.00        UREA    :      .00        AMMONIA      :      .33
```

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                        EASTERN ARCTIC 1980

 LAT 51 36.70'N       LONG 56 13.30'W        DATE 16 07 80    DEPTH   6M
----------------------------------------------------------------------------
     I          P          I          P          I          P          I          P
----------------------------------------------------------------------------

  753.2        .28      693.9        .60      622.0        .33      609.3        .42
  473.9        .46      435.8        .99      387.2        .83      380.8        .76
  275.0       1.14      275.0        .99      262.3       1.24      203.1       1.23
  175.6       1.19      175.6       1.02      139.6       1.42      122.7       1.28
   95.6       1.42       80.4       1.28       68.5       1.45       63.5       1.30
   52.5       1.55       49.5       1.30       39.8       1.28       33.0       1.21
   29.6       1.23       22.8       1.10       21.6       1.07       14.4        .77
   13.5        .79       10.6        .57        9.8        .50        7.5        .33
    6.6        .33        5.3        .30        4.7        .25        3.1        .17
    2.8        .14        2.4        .09        2.0        .10        1.7        .11
    1.5        .06        1.2        .06        1.1        .05

                          PARAMETER VALUES

          PS :      1.75           ALPHA :      .071          BETA :     .0035

        ( 1.67,  1.82 )          ( .067, .076 )          ( .0031,   .0040 )

  SAMPLE TEMPERATURE  6.6  C               INCUBATION TEMPERATURE  1.5  C


 CHLOROPHYLL :     1.26      RNA    :   13.56       PHOSPHATE   :     .19

 CARBON      :    86.00      DNA    :    5.34       NITRATE     :     .15

 NITROGEN    :    13.00      ATP    :    1.05       SILICATE    :    3.31

 PROTEIN     :   303.00      UREA   :     .00       AMMONIA     :     .33
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                              EASTERN ARCTIC 1980

 LAT 54 04.60'N       LONG 52 45.00'W         DATE 17 07 80     DEPTH   4M
--------------------------------------------------------------------------------
     I           P          I           P           I          P         I          P
--------------------------------------------------------------------------------

 871.6       12.81      761.6       11.28      740.5       11.40      668.5       11.21
 660.1       12.43      558.5       11.31      550.1       11.15      469.7       13.20
 452.7       12.00      338.5       12.99      317.3       11.75      296.2       11.49
 203.1       12.73      181.9       10.26      152.3       10.38      122.7       10.92
  87.6       10.37       78.3       10.34       69.8       10.11       59.2        8.97
  49.9        8.12       42.3        6.61       42.3        6.55       36.0        5.44
  27.9        3.88       25.4        3.27       19.9        3.10       17.3        1.74
  12.2        1.90       12.2        1.06        9.1        1.14        8.2         .58
   6.6         .90        6.1         .25        3.9         .14        3.6         .17
   3.6         .00        2.8         .00        2.8         .17        1.9         .00
   1.8         .06


                                PARAMETER VALUES

          PS :    12.58            ALPHA :      .210             BETA :    .0011

        ( 11.91, 13.25 )          ( .197, .224 )              ( -.0001,  .0024 )

  SAMPLE TEMPERATURE  6.5  C                    INCUBATION TEMPERATURE  8.5  C


 CHLOROPHYLL :      .11        RNA     :     7.33        PHOSPHATE    :     .12

 CARBON      :    75.00        DNA     :     6.09        NITRATE      :     .21

 NITROGEN    :    13.00        ATP     :      .58        SILICATE     :     .02

 PROTEIN     :   182.20        UREA    :      .12        AMMONIA      :     .11
```

EASTERN ARCTIC 1980

LAT 54 04.60'N LONG 52 45.00'W DATE 17 07 80 DEPTH 4M

I	P	I	P	I	P	I	P
846.3	9.90	825.1	8.15	799.7	10.10	740.5	8.97
698.2	9.39	666.4	10.94	655.9	9.51	486.6	9.47
457.0	9.76	454.9	10.70	342.7	10.16	300.4	10.00
275.0	9.50	232.7	9.90	228.5	11.05	192.5	8.80
169.3	9.91	126.9	9.32	110.0	9.62	81.2	9.40
74.0	9.68	59.2	8.71	55.9	8.32	44.4	7.07
42.3	7.28	29.6	5.86	29.6	5.28	18.6	3.14
15.7	3.39	14.0	1.01	12.7	2.24	9.5	1.26
8.9	1.39	7.3	.88	6.6	1.15	4.4	.56
4.0	.58	3.2	.29	2.8	.26	2.2	.24
2.1	.31	1.6	.12	1.6	.00		

PARAMETER VALUES

PS : 10.58	ALPHA : .249	BETA : .0015
(10.19, 10.98)	(.234, .265)	(.0007, .0023)

SAMPLE TEMPERATURE 6.5 C INCUBATION TEMPERATURE 5.0 C

CHLOROPHYLL :	.11	RNA :	7.33	PHOSPHATE :	.12
CARBON :	75.00	DNA :	6.09	NITRATE :	.21
NITROGEN :	13.00	ATP :	.58	SILICATE :	.02
PROTEIN :	182.20	UREA :	.12	AMMONIA :	.11

```
                              EASTERN ARCTIC 1980

 LAT 54 04.60'N        LONG 52 45.00'W          DATE 17 07 80     DEPTH    4M
--------------------------------------------------------------------------------
    I          P          I          P          I          P          I          P
--------------------------------------------------------------------------------

 791.3       11.13      727.8       9.93      655.9       11.11      645.3       10.26
 634.7       11.03      495.1       8.72      461.2       10.87      359.7       10.22
 357.5        9.74      351.2      10.35      281.4       10.43      251.8        9.67
 211.6        9.52      194.6       9.33      148.1       10.18      139.6        9.56
  95.2        9.53       86.7       8.18       69.4        8.36       52.9        6.84
  47.4        5.65       39.4       5.36       33.9        5.09       25.4        3.45
  16.1        2.23       15.2       2.11       11.4        1.17       11.2        1.08
   8.2         .67        7.4       1.01        5.3         .05        5.0         .01
   3.3         .00        3.3        .00        1.7         .00        1.4         .00


                              PARAMETER VALUES

        PS :     10.33          ALPHA :       .186          BETA :     .0000

       ( 9.86, 10.80 )          ( .174, .199 )           ( -.0009,  .0009 )

   SAMPLE TEMPERATURE  6.5  C                INCUBATION TEMPERATURE  7.0  C


  CHLOROPHYLL :      .11        RNA    :    7.33       PHOSPHATE   :      .12

  CARBON      :    75.00        DNA    :    6.09       NITRATE     :      .21

  NITROGEN    :    13.00        ATP    :     .58       SILICATE    :      .02

  PROTEIN     :   182.20        UREA   :     .12       AMMONIA     :      .11
```

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                                EASTERN ARCTIC 1980

LAT 54 04.60'N        LONG 52 45.00'W           DATE 17 07 80    DEPTH   4M
------------------------------------------------------------------------------
    I           P          I            P          I           P          I           P
------------------------------------------------------------------------------

  799.7        7.40      727.8         5.76      643.2        4.15      617.8        6.89
  490.8        5.22      461.2         6.92      452.7        6.52      393.5        5.65
  304.7        7.15      283.5         6.98      262.3        5.79      194.6        6.48
  177.7        6.38      172.6         5.99      133.3        6.47      120.6        6.18
   91.0        6.38       91.0         5.71       70.7        5.71       59.2        4.55
   51.6        5.36       44.0         4.31       36.8        4.30       31.7        3.60
   28.8        3.31       23.7         2.95       21.6        2.41       14.4        1.50
   13.1        1.76       10.2          .02        9.4         .85        7.1         .41
    6.4         .70        5.7          .61        4.7         .45        3.5         .00
    3.1         .11        2.3          .20        2.2         .10        1.6         .27
    1.6         .18        1.5          .00        1.1         .00

                              PARAMETER VALUES

          PS :      6.79          ALPHA :      .152           BETA :    .0011

         ( 6.39,   7.19 )         ( .138, .165 )           (  .0002,   .0021 )

  SAMPLE TEMPERATURE  6.5  C                 INCUBATION TEMPERATURE  2.0  C


  CHLOROPHYLL :      .11      RNA     :     7.33      PHOSPHATE   :     .12

  CARBON      :    75.00      DNA     :     6.09      NITRATE     :     .21

  NITROGEN    :    13.00      ATP     :      .58      SILICATE    :     .02

  PROTEIN     :   182.20      UREA    :      .12      AMMONIA     :     .11
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                              EASTERN ARCTIC 1980

LAT 53 55.10'N       LONG 53 16.20'W         DATE 18 07 80    DEPTH  30M
--------------------------------------------------------------------------------
   I            P          I            P          I            P          I            P
--------------------------------------------------------------------------------

867.4         .18     816.6          .13     744.7          .19     740.5          .23
698.2         .35     681.2          .56     655.9          .45     541.6          .79
465.4         .78     457.0         1.13     448.5          .78     351.2         1.15
334.3        1.26     313.1         1.24     262.3         1.43     198.9         1.40
169.3        1.63     131.2         1.54     117.6         1.59      88.9         1.50
 67.7        1.63      60.1         1.54      48.7         1.46      45.3         1.41
 39.4        1.45      34.3         1.26      28.8         1.25      21.2          .89
 19.5         .81      14.8          .53      14.0          .63      10.3          .43
  9.9         .35       7.4          .26       6.9          .27       4.4          .13
  4.3         .14       3.3          .07       3.0          .09       2.4          .04
  2.3         .05       1.8          .02       1.8          .03

                               PARAMETER VALUES

         PS :      2.53           ALPHA :       .052            BETA :     .0063

       ( 2.36,   2.70 )         ( .049, .055 )            (  .0054,  .0072 )

  SAMPLE TEMPERATURE  0.5  C              INCUBATION TEMPERATURE  8.0  C


 CHLOROPHYLL :   14.41       RNA      :   24.63       PHOSPHATE    :       .34

 CARBON      :  293.00       DNA      :    6.67       NITRATE      :      1.30

 NITROGEN    :   46.00       ATP      :    2.80       SILICATE     :       .00

 PROTEIN     :  630.20       UREA     :     .00       AMMONIA      :       .41
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                              EASTERN ARCTIC 1980

LAT 53 55.10'N        LONG 53 16.20'W          DATE 18 07 80     DEPTH  30M
-------------------------------------------------------------------------------
    I             P           I            P          I           P          I            P
-------------------------------------------------------------------------------

825.1          .08       825.1          .05     779.6         .08     740.5          .10
647.4          .13       592.4          .49     571.2         .28     499.3          .22
473.9          .82       431.6          .13     406.2         .45     334.3          .27
334.3         1.02       249.6          .50     249.6         .85     211.6         1.03
181.9          .81       141.7         1.06     118.5         .97      99.4         1.14
 82.9          .93        68.5         1.11      57.1         .97      45.3         1.09
 39.4         1.00        31.3         1.04      30.0         .98      19.0          .66
 18.2          .95        13.5          .67      13.5         .50       9.9          .32
  9.7          .50         7.0          .23       6.6         .31       4.4          .12
  4.1          .22         3.1          .11       3.1         .07       2.0          .04
  1.9          .05         1.6          .02       1.5         .04

                               PARAMETER VALUES

          PS :      1.46            ALPHA :      .056            BETA :     .0041

        ( 1.32,   1.60 )          ( .049, .063 )            ( .0032,   .0050 )

   SAMPLE TEMPERATURE  0.5  C                  INCUBATION TEMPERATURE  4.0  C


CHLOROPHYLL :   14.41         RNA      :   24.63        PHOSPHATE    :      .34

CARBON      :  293.00         DNA      :    6.67        NITRATE      :     1.30

NITROGEN    :   46.00         ATP      :    2.80        SILICATE     :      .00

PROTEIN     :  630.20         UREA     :     .00        AMMONIA      :      .41
```

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                              EASTERN ARCTIC 1980

  LAT 53 55.10'N       LONG 53 16.20'W          DATE 18 07 80    DEPTH  30M
-------------------------------------------------------------------------------
     I            P           I           P          I          P          I          P
-------------------------------------------------------------------------------

  753.2         .11        719.3         .12       634.7        .16       605.1        .20
  537.4         .42        495.1         .11       431.6        .54       368.1        .83
  321.6         .82        287.7         .90       266.6       1.06       241.2       1.00
  190.4        1.11        165.0        1.15       121.4       1.26       107.5       1.22
   88.0        1.24         76.2        1.21        65.2       1.32        55.0       1.19
   51.6         .99         40.6        1.11        37.2       1.11        30.5       1.01
   28.8         .81         22.4         .81        15.2        .54        14.0        .48
   11.6         .26         11.2         .35         8.3        .22         8.1        .23
    6.0         .18          5.3         .15         3.5        .08         3.3        .07
    2.5         .04          2.2         .04         1.8        .02         1.8        .03
    1.4         .02          1.4         .02

                                PARAMETER VALUES

          PS :      2.33          ALPHA :      .040           BETA :    .0083

         (  2.08,  2.58 )        ( .037, .042 )             (  .0066,  .0100 )

   SAMPLE TEMPERATURE  0.5  C               INCUBATION TEMPERATURE  7.0  C


  CHLOROPHYLL :   14.41        RNA      :   24.63       PHOSPHATE   :     .34

  CARBON      :  293.00        DNA      :    6.67       NITRATE     :    1.30

  NITROGEN    :   46.00        ATP      :    2.80       SILICATE    :     .00

  PROTEIN     :  630.20        UREA     :     .00       AMMONIA     :     .41
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                              EASTERN ARCTIC 1980

 LAT 53 55.10'N      LONG 53 16.20'W        DATE 18 07 80    DEPTH  30M
--------------------------------------------------------------------------------
     I           P          I          P          I          P          I          P
--------------------------------------------------------------------------------

 787.1         .08       753.2        .04       655.9        .04       617.9        .05
 499.4         .07       474.0        .27       444.4        .13       364.0        .17
 317.4         .43       283.6        .31       275.1        .34       218.0        .57
 186.3         .60       175.7        .61       133.4        .72       114.3        .77
  84.7         .89        77.9        .86        67.8        .59        57.2        .80
  51.7         .91        44.9        .88        36.9        .62        30.1        .88
  28.0         .78        24.2        .75        21.7        .82        13.6        .60
  12.8         .56         9.6        .51         9.1        .46         6.7        .32
   6.4         .32         5.0        .23         4.7        .22         2.9        .12
   2.9         .11         2.1        .09         2.0        .07         1.5        .06
   1.5         .04         1.2        .03         1.1        .03

                              PARAMETER VALUES

       PS :      1.21          ALPHA :      .058           BETA :     .0051

       ( 1.15,   1.27 )        ( .055, .062 )              ( .0044,   .0057 )

  SAMPLE TEMPERATURE  0.5  C               INCUBATION TEMPERATURE  1.5  C


 CHLOROPHYLL :   14.41      RNA     :   24.63      PHOSPHATE    :     .34

 CARBON      :  293.00      DNA     :    6.67      NITRATE      :    1.30

 NITROGEN    :   46.00      ATP     :    2.80      SILICATE     :     .00

 PROTEIN     :  630.20      UREA    :     .00      AMMONIA      :     .41
```

EASTERN ARCTIC 1980

LAT 53 53.30'N LONG 55 17.50'W DATE 19 07 80 DEPTH 23M

I	P	I	P	I	P	I	P
888.6	2.02	859.0	1.62	803.9	2.24	765.9	1.86
761.6	3.38	748.9	3.03	668.5	4.10	664.3	4.13
571.2	4.12	533.1	4.24	473.9	4.26	410.4	4.17
387.2	3.96	359.7	4.34	296.2	4.45	245.4	4.26
177.7	4.32	143.9	4.22	103.7	4.12	101.6	3.67
78.3	3.41	56.3	3.64	51.6	2.85	41.5	3.45
35.1	2.64	29.2	2.70	19.9	1.43	18.2	1.83
14.4	1.00	13.5	1.18	10.7	.78	9.8	.65
7.7	.55	6.9	.54	5.5	.24	4.6	.23
3.7	.23	3.5	.11	2.7	.12	2.7	.07
1.9	.10	1.9	.02				

PARAMETER VALUES

PS :	5.85	ALPHA :	.091	BETA :	.0053
	(5.35, 6.34)		(.083, .099)		(.0040, .0066)

SAMPLE TEMPERATURE 4.5 C INCUBATION TEMPERATURE 8.0 C

CHLOROPHYLL	:	.30	RNA	:	-	PHOSPHATE	:	.82
CARBON	:	64.00	DNA	:	-	NITRATE	:	.06
NITROGEN	:	18.00	ATP	:	.51	SILICATE	:	.72
PROTEIN	:	60.40	UREA	:	.57	AMMONIA	:	.29

```
                              EASTERN ARCTIC 1980

LAT 53 53.30'N      LONG 55 17.50'W       DATE 19 07 80     DEPTH  23M
--------------------------------------------------------------------------------
   I          P          I          P          I          P          I          P
--------------------------------------------------------------------------------

875.9       1.41      837.8        .95      787.0       1.36      761.6       1.29
699.2       2.48      677.0       2.87      626.2       1.83      571.2       2.63
558.5       3.01      473.9       3.37      461.2       2.91      363.9       3.46
302.5       2.80      296.2       3.22      220.0       3.32      184.1       3.85
171.4       3.88      126.9       4.28      120.6       3.48       99.0       3.30
 98.6       3.97       69.8       3.49       64.3       3.34       48.7       3.27
 47.8       2.93       33.4       3.00       30.5       3.03       19.5       1.55
 17.3       1.56       14.4       1.00       13.5        .99       10.2        .69
  9.1        .82        7.0        .60        5.7        .53        4.2        .24
  3.6        .36        3.2        .15        2.5        .19        2.2        .07
  1.8        .14        1.4        .10        1.3        .07

                              PARAMETER VALUES

        PS :     4.89          ALPHA :      .110          BETA :     .0062

      ( 4.59,  5.20 )         ( .101, .120 )          (  .0051,  .0073 )

  SAMPLE TEMPERATURE  4.5  C               INCUBATION TEMPERATURE  5.0  C


 CHLOROPHYLL :      .30       RNA    :     -         PHOSPHATE  :      .82

 CARBON      :   64.00        DNA    :     -         NITRATE    :      .06

 NITROGEN    :   18.00        ATP    :    .51        SILICATE   :      .72

 PROTEIN     :   60.40        UREA   :    .57        AMMONIA    :      .29
```

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                              EASTERN ARCTIC 1980

LAT 53 53.30'N       LONG 55 17.50'W        DATE 19 07 80     DEPTH  23M
----------------------------------------------------------------------------
   I          P          I          P          I          P          I          P
----------------------------------------------------------------------------

736.2        .67      727.8        .83      651.6        .69      592.4       1.06
520.5       1.70      473.9       1.13      418.9       1.90      376.6       2.50
363.9       1.72      300.4       2.22      251.8       1.74      237.0       2.46
179.8       1.98      177.7       2.06      160.8       2.34      114.2       2.06
105.8       2.38       88.9       2.22       69.8       2.37       59.2       2.11
 53.7       2.29       44.4       2.06       38.1       2.19       35.1       1.83
 30.0       1.99       24.1       1.58       20.7       1.50       14.8        .90
 13.1        .95       10.6        .66        9.5        .55        7.0        .43
  6.4        .26        4.8        .26        4.8        .27        2.8        .02
  2.6        .04        2.4        .05        2.4        .09        2.1        .01
  1.7        .04        1.1        .04        1.1        .00

                             PARAMETER VALUES

        PS :      2.99           ALPHA :     .087            BETA :    .0046

      ( 2.79,   3.19 )          ( .080, .095 )           (  .0037,   .0055 )

  SAMPLE TEMPERATURE  4.5  C              INCUBATION TEMPERATURE  2.0  C


 CHLOROPHYLL :     .30        RNA    :     -         PHOSPHATE   :     .82

 CARBON      :   64.00        DNA    :     -         NITRATE     :     .06

 NITROGEN    :   18.00        ATP    :    .51        SILICATE    :     .72

 PROTEIN     :   60.40        UREA   :    .57        AMMONIA     :     .29
```

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                              EASTERN ARCTIC 1980

 LAT 53 53.30'N       LONG 55 17.50'W          DATE 19 07 80     DEPTH  23M
---------------------------------------------------------------------------------
     I            P         I            P          I           P          I            P
---------------------------------------------------------------------------------

   782.8        .79      729.9         .41      655.9         .67      613.5         .81
   486.6        .50      427.4        1.19      385.0        1.63      382.9        1.09
   304.7       1.56      285.6        1.63      277.2        1.81.     186.2        1.58
   165.0       1.89      120.6        1.61      118.5        1.87       88.0        1.43
    86.7       1.71       71.9        2.17       61.4        1.51       55.9        2.20
    46.5       2.10       40.2        1.83       33.9        1.78       30.5        1.82
    25.0       1.61       21.2        1.26       15.2        1.07       14.4         .85
    10.7        .74       10.3         .69        7.9         .45        7.5         .39
     4.8        .29        4.7         .32        3.3         .02        2.9         .16
     2.2        .00        1.9         .02        1.6         .00        1.4         .00
     1.2        .01        1.1         .00


                              PARAMETER VALUES

         PS :      2.34           ALPHA :       .092            BETA :     .0040

        ( 2.18,  2.50 )         ( .083, .102 )              (  .0032,  .0048 )


  SAMPLE TEMPERATURE   4.5   C               INCUBATION TEMPERATURE   0.0   C


  CHLOROPHYLL :      .30        RNA      :      -        PHOSPHATE    :      .82

  CARBON      :   64.00         DNA      :      -        NITRATE      :      .06

  NITROGEN    :   18.00         ATP      :     .51       SILICATE     :      .72

  PROTEIN     :   60.40         UREA     :     .57       AMMONIA      :      .29
```

EASTERN ARCTIC 1980

LAT 54 52.60'N   LONG 52 22.40'W   DATE 20 07 80   DEPTH 24M

I	P	I	P	I	P	I	P
901.3	.36	867.4	.26	787.0	.54	778.6	.47
689.7	1.22	685.5	1.26	660.1	2.92	588.2	1.14
518.8	3.14	376.6	2.64	323.7	3.48	317.3	3.87
253.9	3.59	198.9	3.78	156.6	3.74	129.1	3.75
107.9	3.85	89.3	3.65	86.7	3.94	66.0	3.84
63.5	3.65	47.8	3.70	43.2	3.59	32.2	3.21
30.5	2.91	18.2	3.26	17.8	2.03	12.5	3.61
11.6	1.52	8.8	.86	8.7	.96	6.4	.56
6.4	.73	4.1	.32	3.8	.35	2.9	.19
2.8	.24	2.0	.16	2.0	.15	1.6	.09
1.6	.15						

PARAMETER VALUES

PS :	5.14	ALPHA :	.170	BETA :	.0094
	(4.70, 5.59)		(.148, .193)		(.0073, .0115)

SAMPLE TEMPERATURE 4.0 C   INCUBATION TEMPERATURE 8.9 C

CHLOROPHYLL :	1.54	RNA :	22.28	PHOSPHATE :	.44
CARBON :	137.00	DNA :	8.96	NITRATE :	4.80
NITROGEN :	28.00	ATP :	-	SILICATE :	1.44
PROTEIN :	297.00	UREA :	.00	AMMONIA :	.16

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                              EASTERN ARCTIC 1980

  LAT 54 52.60'N        LONG 52 22.40'W          DATE 20 07 80     DEPTH  24M
--------------------------------------------------------------------------------
     I          P          I          P          I          P          I          P
--------------------------------------------------------------------------------

  833.6        .15      833.6        .08      761.6        .28      748.9        .16
  710.9        .41      660.1        .32      617.8       1.08      592.4        .69
  545.8       1.26      482.4       1.27      423.1       1.44      325.8       2.57
  272.9       2.37      258.1       2.43      211.6       2.52      173.5       2.54
  135.4       2.84      114.2       2.52       91.8       2.43       76.2       3.36
   56.7       2.39       50.4       2.87       38.9       3.00       37.2       3.11
   26.7       2.91       26.7       2.91       17.3       1.78       16.5       2.01
   12.4       1.25       11.9       1.48        8.8        .94        8.3       1.13
    6.1        .66        5.8        .83        4.1        .34        4.0        .33
    3.0        .18        2.9        .21        2.3        .10        2.0        .23
    1.6        .05        1.5        .02

                                PARAMETER VALUES

        PS :      4.01          ALPHA :        .156           BETA :     .0103

       ( 3.73,  4.29 )          ( .142, .170 )            (  .0086,   .0119 )

   SAMPLE TEMPERATURE  4.5  C               INCUBATION TEMPERATURE  5.2  C


  CHLOROPHYLL :      1.54      RNA     :    22.28      PHOSPHATE    :       .44

  CARBON      :    137.00      DNA     :     8.96      NITRATE      :      4.80

  NITROGEN    :     28.00      ATP     :      -        SILICATE     :      1.44

  PROTEIN     :    297.00      UREA    :      .00      AMMONIA      :       .16
```

EASTERN ARCTIC 1980

LAT 54 52.60'N LONG 52 22.40'W DATE 20 07 80 DEPTH 24M

I	P	I	P	I	P	I	P
761.6	.14	732.0	.13	655.9	.18	617.8	.15
541.6	.62	490.8	.29	452.7	.49	363.9	.48
342.7	1.37	325.8	.77	253.9	.96	224.3	1.56
190.4	1.69	156.6	1.69	148.1	2.00	112.1	2.25
78.7	2.24	73.6	2.16	61.8	2.09	51.6	1.86
45.7	1.42	38.1	1.69	31.3	2.09	29.2	2.52
23.7	1.98	20.7	1.55	14.8	1.35	13.5	.97
10.4	1.18	9.9	1.26	7.0	.74	6.6	.95
4.9	.63	4.7	.50	2.9	.26	2.9	.32
2.2	.25	2.0	.22	1.6	.15	1.5	.12
1.1	.06	1.1	.07				

PARAMETER VALUES

PS :	2.91	ALPHA :	.129	BETA :	.0102
	(2.67, 3.14)		(.117, .142)		(.0083, .0122)

SAMPLE TEMPERATURE 4.5 C INCUBATION TEMPERATURE 2.0 C

CHLOROPHYLL :	1.54	RNA :	22.28	PHOSPHATE :	.44
CARBON :	137.00	DNA :	8.96	NITRATE :	4.80
NITROGEN :	28.00	ATP :	-	SILICATE :	1.44
PROTEIN :	297.00	UREA :	.00	AMMONIA :	.16

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                              EASTERN ARCTIC 1980

 LAT 54 52.60'N       LONG 52 22.40'W        DATE 20 07 80     DEPTH  24M
--------------------------------------------------------------------------
    I          P          I          P          I          P          I          P
--------------------------------------------------------------------------

 803.9       .19      736.2        .02      647.4        .08      592.4        .15
 457.0       .55      457.0        .14      380.8        .31      363.9        .32
 296.2      1.27      253.9        .80      253.9        .70      203.1       1.47
 175.6      1.26      173.5       1.14      131.2       1.69      112.1       1.48
  93.1      1.79       82.5       1.77       69.8       1.36       47.4       1.73
  43.2      1.50       33.0       1.50       32.6       1.43       25.0       1.50
  22.0      1.34       18.6       1.52       12.0       1.25       11.5       1.29
   8.8       .76        8.3        .82        6.4        .76        6.0        .75
   4.9       .44        3.9        .40        3.1        .28        2.7        .32
   2.0       .20        1.8        .27        1.5        .12        1.4        .07
   1.0       .05        1.0        .08

                              PARAMETER VALUES

      PS :      2.24          ALPHA :      .124           BETA :     .0082

    ( 2.07,  2.40 )         ( .113, .136 )          (  .0067,   .0097 )

  SAMPLE TEMPERATURE   4.5  C               INCUBATION TEMPERATURE   0.4  C


 CHLOROPHYLL :     1.54       RNA    :   22.28       PHOSPHATE    :       .44

 CARBON      :   137.00       DNA    :    8.96       NITRATE      :      4.80

 NITROGEN    :    28.00       ATP    :     -         SILICATE     :      1.44

 PROTEIN     :   297.00       UREA   :     .00       AMMONIA      :       .16
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                              EASTERN ARCTIC 1980

LAT 54 51.80'N        LONG 52 41.00'W            DATE 20 07 00     DEPTH  21M
--------------------------------------------------------------------------------
    I            P           I           P           I           P           I           P
--------------------------------------------------------------------------------

880.1          .94       846.3         .89       761.6        1.00       761.6        1.59
685.5         2.59       647.4        1.82       634.7        4.27       554.3        4.43
550.1         3.09       486.6        4.64       440.1        4.87       423.1        5.32
402.0         5.41       393.5        5.80       279.3        5.21       279.3        6.53
220.0         6.01       173.5        5.75       124.8        6.51       102.0        6.73
 78.3         5.73        68.1        6.12        55.0        5.23        43.2        5.49
 41.9         5.78        38.1        4.99        30.5        5.40        21.6        3.89
 19.0         3.84        13.5        2.46        13.1        2.62        10.7        1.62
 10.2         1.78         7.7        1.20         7.3        1.47         4.9         .59
  4.9          .61         3.5         .29         3.3         .36         2.4         .26
  2.3          .16         1.9         .16         1.6         .16

                              PARAMETER VALUES

           PS :      9.31           ALPHA :       .208            BETA :     .0167

         ( 8.55, 10.08 )           ( .190, .225 )              (  .0135,   .0199 )

 SAMPLE TEMPERATURE  5.9  C                 INCUBATION TEMPERATURE  8.0  C


 CHLOROPHYLL :      .38        RNA      :   16.60       PHOSPHATE    :      .31

 CARBON      :   107.00        DNA      :    9.96       NITRATE      :     4.10

 NITROGEN    :    19.00        ATP      :    1.52       SILICATE     :      .95

 PROTEIN     :   210.00        UREA     :     .00       AMMONIA      :      .36
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                              EASTERN ARCTIC 1980

 LAT 54 51.80'N       LONG 52 41.00'W        DATE 20 07 00     DEPTH  21M
-----------------------------------------------------------------------------
    I           P          I           P          I          P          I          P
-----------------------------------------------------------------------------

 863.2        .49     808.2        .38     782.8        .72     740.5        .51
 664.3       2.15     560.1       1.72     634.7       1.08     559.5       2.21
 486.6       3.08     478.1       4.14     427.4       3.07     363.9       4.93
 336.4       4.04     327.9       4.03     247.5       5.06     150.2       5.01
 139.6       4.54     112.1       5.16      72.4       4.89      65.2       4.69
  58.8       4.89      44.4       4.81      40.6       4.60      30.5       4.50
  28.4       4.12      19.9       3.46      18.6       3.65      13.5       2.58
  11.8       2.67       9.7       1.80       9.3       1.89       7.2       1.64
   6.8       1.33       4.2        .67       3.8        .82       3.0        .43
   3.0        .46       2.1        .24       2.1        .14       1.3        .11
   1.3        .11


                                PARAMETER VALUES

           PS :     6.91          ALPHA :      .232          BETA :    .0137

         ( 6.41,   7.42 )       ( .210, .253 )           (  .0113,   .0160 )

  SAMPLE TEMPERATURE  8.0  C              INCUBATION TEMPERATURE  5.5  C


 CHLOROPHYLL :      .38        RNA     :   16.60      PHOSPHATE    :      .31

 CARBON      :   107.00        DNA     :    9.96      NITRATE      :     4.10

 NITROGEN    :    19.00        ATP     :    1.52      SILICATE     :      .95

 PROTEIN     :   210.00        UREA    :     .00      AMMONIA      :      .36
```

EASTERN ARCTIC 1980

LAT 54 51.80'N LONG 52 41.00'W DATE 20 07 00 DEPTH 21M

I	P	I	P	I	P	I	P
732.0	.40	710.9	.30	630.5	.46	583.9	.57
533.1	1.52	490.8	.58	418.9	1.26	351.2	2.17
344.9	1.51	325.8	2.44	277.2	2.22	232.7	2.57
215.9	2.53	162.9	2.61	160.8	2.79	127.8	3.16
121.0	3.24	96.1	2.78	81.2	2.56	67.7	2.75
53.3	3.34	48.2	2.73	41.9	2.63	35.5	2.75
31.3	2.73	27.5	2.82	19.9	1.75	16.5	1.99
13.5	1.64	12.7	1.40	9.7	1.05	8.5	1.22
6.8	.80	5.9	.91	4.2	.42	3.4	.51
3.0	.25	2.5	.33	2.5	.19	1.7	.18
1.7	.06	1.3	.00				

PARAMETER VALUES

PS :	ALPHA :	BETA :
4.17	.144	.0109
(3.90, 4.44)	(.133, .155)	(.0091, .0126)

SAMPLE TEMPERATURE 5.9 C INCUBATION TEMPERATURE 2.0 C

CHLOROPHYLL :	.38	RNA :	16.60	PHOSPHATE :	.31
CARBON :	107.00	DNA :	9.96	NITRATE :	4.10
NITROGEN :	19.00	ATP :	1.52	SILICATE :	.95
PROTEIN :	210.00	UREA :	.00	AMMONIA :	.36

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                              EASTERN ARCTIC 1980

   LAT 54 51.80'N        LONG 52 41.00'W          DATE 20 07 00    DEPTH  21M
  -----------------------------------------------------------------------------
      I            P          I           P          I           P          I           P
  -----------------------------------------------------------------------------

   719.3         .37       617.8        .19       600.8        .21       473.9         .22
   444.3         .61       355.4        .85       302.5       1.16       300.4        1.74
   296.2         .54       226.4       1.88       224.3       1.78       222.1        1.46
   167.1        1.99       154.0       1.98       108.3       2.19       102.4        1.79
    87.6        2.25        81.2       2.07        61.4       2.20        61.4        2.02
    48.7        2.20        40.6       1.95        40.2       1.59        29.6        1.65
    27.9        1.97        16.1       1.73        15.2       1.66        12.3        1.51
    12.3        1.34         8.5       1.19         7.2       1.27         6.8         .93
     5.5         .89         3.8        .54         3.4        .60         3.0         .34
     2.5         .31         2.1        .27         1.7        .25         1.3         .17
     1.3         .11


                                PARAMETER VALUES

          PS :      2.65            ALPHA :       .164             BETA :     .0075

        (  2.48,  2.82 )           ( .147, .181 )             (  .0062,   .0089 )

    SAMPLE TEMPERATURE  5.9  C              INCUBATION TEMPERATURE  00.0 C


   CHLOROPHYLL :      .38       RNA      :    16.60       PHOSPHATE    :      .31

   CARBON      :   107.00       DNA      :     9.96       NITRATE      :     4.10

   NITROGEN    :    19.00       ATP      :     1.52       SILICATE     :      .95

   PROTEIN     :   210.00       UREA     :      .00       AMMONIA      :      .36
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                                EASTERN ARCTIC 1980

 LAT 53 55.30'N       LONG 56 18.00'W          DATE 21 07 80     DEPTH  31M
--------------------------------------------------------------------------------
     I          P          I          P          I          P          I          P
--------------------------------------------------------------------------------

 888.6         .15      812.4        .15      740.5        .19      719.3        .24
 715.1         .41      681.2        .83      634.7        .25      613.5       1.30
 558.5         .75      550.1       1.22      495.1       1.24      444.3       1.74
 414.7        2.24      347.0       2.50      289.9       2.82      253.9       2.78
 169.3        2.66      156.6       3.03      116.4       3.05      116.4       2.94
  83.6        3.08       76.2       2.91       59.2       2.84       52.9       2.74
  41.5        2.79       35.1       2.55       31.3       2.33       22.0       1.78
  22.0        1.77       16.9       1.25       16.1       1.20       11.0        .90
   9.3         .85        8.0        .55        7.2        .56        5.1        .27
   4.2         .25        3.4        .18        3.4        .22        2.1        .11
   1.7         .11        1.7        .06        1.7        .07

                                  PARAMETER VALUES

           PS :      5.31            ALPHA :       .094            BETA :     .0154

         ( 4.80,    5.83 )         ( .087, .101 )          ( .0125,   .0182 )

   SAMPLE TEMPERATURE  0.5  C                  INCUBATION TEMPERATURE   9.0  C


  CHLOROPHYLL :      3.58        RNA       :   12.31        PHOSPHATE     :       .57

  CARBON      :   183.00         DNA       :    4.83        NITRATE       :      1.30

  NITROGEN    :    24.00         ATP       :    2.01        SILICATE      :       .87

  PROTEIN     :   351.40         UREA      :     .42        AMMONIA       :       .57
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                              EASTERN ARCTIC 1980

LAT 53 55.30'N        LONG 56 18.00'W          DATE 21 07 80    DEPTH  31M
-------------------------------------------------------------------------------
   I          P           I           P          I          P          I           P
-------------------------------------------------------------------------------

833.6        .08       803.9         .02      765.9        .04      710.9         .05
634.7        .15       626.2         .25      596.6        .15      583.9         .34
486.6        .50       440.1         .45      418.9        .54      330.0         .70
321.6        .83       275.0         .97      258.1       1.22      203.1        1.44
150.2       1.24       139.6        1.61      109.2       1.75       95.6        1.99
 78.3       1.70        65.6        1.68       55.9       2.07       41.5        1.97
 37.7       2.08        31.3        1.80       27.5       1.94       17.8        1.53
 16.9       1.55        12.3        1.22       11.8       1.23        8.9        1.01
  9.5        .74         6.8         .68        6.3        .51        3.8         .25
  3.4        .33         3.0         .19        2.5        .15        1.7         .15
  1.7        .16         1.7         .09        1.7        .11

                                PARAMETER VALUES

          PS :     2.65          ALPHA :      .131            BETA :    .0101

        ( 2.53,  2.77 )         ( .124, .139 )             (  .0090,  .0111 )

 SAMPLE TEMPERATURE  0.5  C                 INCUBATION TEMPERATURE  5.0  C


 CHLOROPHYLL :    3.58       RNA      :   12.31       PHOSPHATE    :      .57

 CARBON      :  183.00       DNA      :    4.83       NITRATE      :     1.30

 NITROGEN    :   24.00       ATP      :    2.01       SILICATE     :      .87

 PROTEIN     :  351.40       UREA     :     .42       AMMONIA      :      .57
```

EASTERN ARCTIC 1980

LAT 53 55.30'N   LONG 56 18.00'W   DATE 21 07 80   DEPTH 31M

I	P	I	P	I	P	I	P
740.5	.02	698.2	.01	622.0	.03	592.4	.08
592.4	.27	507.8	.13	452.7	.24	389.3	.46
385.0	.41	330.0	.39	270.8	.69	270.8	.84
229.5	.96	194.6	.72	186.2	1.21	152.3	1.04
131.2	1.43	110.0	1.45	93.1	1.17	75.3	1.40
71.9	1.47	58.4	1.27	49.5	1.53	38.9	1.43
35.1	1.46	27.9	1.56	27.5	1.24	17.3	1.06
16.1	1.35	12.3	1.41	11.8	1.23	8.5	.77
7.6	.85	6.3	.58	5.9	.45	3.8	.33
3.4	.36	2.5	.16	2.5	.18	1.7	.12
1.7	.15	1.3	.07	1.3	.11		

PARAMETER VALUES

PS :	ALPHA :	BETA :
1.92	.129	.0074
(1.81, 2.03)	(.118, .140)	(.0063, .0085)

SAMPLE TEMPERATURE 0.5 C   INCUBATION TEMPERATURE 2.0 C

CHLOROPHYLL :	3.58	RNA :	12.31	PHOSPHATE :	.57
CARBON :	183.00	DNA :	4.83	NITRATE :	1.30
NITROGEN :	24.00	ATP :	2.01	SILICATE :	.87
PROTEIN :	351.40	UREA :	.42	AMMONIA :	.57

```
                              EASTERN ARCTIC 1980

 LAT 53 55.30'N       LONG 56 18.00'W          DATE 21 07 80    DEPTH  31M
--------------------------------------------------------------------------------
    I          P          I          P          I          P          I          P
--------------------------------------------------------------------------------

 740.5        .08      689.7        .02      579.7        .05      567.0        .04
 499.3        .07      486.6        .22      440.1        .14      372.4        .15
 313.1        .40      292.0        .41      279.3        .30      237.0        .73
 205.2        .40      203.1        .65      175.6       1.05      131.2        .83
 106.6        .87       86.7       1.03       80.4       1.06       67.7       1.03
  61.4       1.18       50.8       1.12       49.5       1.13       38.9       1.00
  33.9        .96       28.4       1.10       24.5       1.29       17.8        .98
  16.1       1.06       11.6        .90       11.2        .85        8.3        .69
   8.3        .77        6.1        .54        6.1        .56        3.6        .28
   3.5        .30        2.9        .15        2.5        .18        2.1        .14
   1.8        .14        1.4        .02        1.4        .08

                              PARAMETER VALUES

         PS :      1.46          ALPHA :      .112          BETA :    .0065

       ( 1.39,   1.54 )        ( .103, .121 )          (  .0056,   .0073 )

   SAMPLE TEMPERATURE  0.5  C              INCUBATION TEMPERATURE  0.0  C


  CHLOROPHYLL :     3.58       RNA     :   12.31        PHOSPHATE    :      .57

  CARBON      :   183.00       DNA     :    4.83        NITRATE      :     1.30

  NITROGEN    :    24.00       ATP     :    2.01        SILICATE     :      .87

  PROTEIN     :   351.40       UREA    :     .42        AMMONIA      :      .57
```

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                          EASTERN ARCTIC 1980

LAT 54 31.10'N        LONG 56 48.90'W          DATE 22 07 80     DEPTH   4M
------------------------------------------------------------------------------
   I          P          I          P          I          P          I          P
------------------------------------------------------------------------------

837.8       4.57     803.9       4.01     698.2       3.95     698.2       4.04
634.7       4.79     613.5       4.93     613.5       4.05     550.1       4.22
528.9       5.28     465.4       5.22     444.3       5.31     414.7       4.81
359.7       5.04     351.2       5.15     279.3       4.71     245.4       5.27
177.7       4.55     173.5       4.19     114.2       5.48      99.4       4.79
 76.2       4.72      69.8       4.56      59.2       4.44      48.7       4.12
 40.2       4.10      34.7       3.86      28.4       2.99      20.7       2.73
 18.6       2.44      13.5       1.65      12.7        .77       9.3       1.18
  9.1        .88       7.0        .79       6.6        .84       4.4        .33
  4.0        .39       3.3        .20       2.9        .20       2.5        .07
  2.1        .12       1.5        .07       1.5        .00

                          PARAMETER VALUES

        PS :      5.40          ALPHA :      .156          BETA :    .0015

       ( 5.17,    5.63 )        ( .145,  .167 )         ( .0010,   .0020 )

  SAMPLE TEMPERATURE  7.5  C              INCUBATION TEMPERATURE  8.0  C


 CHLOROPHYLL :      .51      RNA     :   15.08      PHOSPHATE   :     .27

 CARBON      :    87.00      DNA     :    5.38      NITRATE     :     .14

 NITROGEN    :     9.00      ATP     :    2.08      SILICATE    :    9.32

 PROTEIN     :   171.20      UREA    :     .27      AMMONIA     :     .16
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                            EASTERN ARCTIC 1980

LAT 54 31.10'N        LONG 56 48.90'W          DATE 22 07 80     DEPTH    4M
--------------------------------------------------------------------------------
   I           P           I           P          I          P          I          P
--------------------------------------------------------------------------------

782.8        1.71        719.3       2.10       708.7       3.03      687.6       2.48
613.5        3.27        571.2       4.08       571.2       3.40      497.2       3.78
473.9        3.61        444.3       4.24       338.5       4.18      317.3       3.84
262.3        3.70        241.2       4.21       224.3       4.00      186.2       4.12
165.0        4.31        114.2       4.25        84.6       3.42       66.4       4.19
 57.1        3.66         48.7       4.37        44.4       3.05       36.4       3.62
 32.2        2.83         26.7       3.04        17.8       2.06       16.1       1.85
 12.3        1.55         11.4       1.51         8.3       1.18        7.4       1.05
  5.3         .94          5.0        .95         3.9        .36        3.7        .36
  2.7         .22          2.6        .15         2.0        .06        1.9        .10
  1.5         .09          1.4        .08


                              PARAMETER VALUES

        PS :      4.90           ALPHA :      .153            BETA :    .0037

       ( 4.65,   5.16 )          ( .140, .165 )           (  .0029,  .0045 )


   SAMPLE TEMPERATURE  7.5  C                 INCUBATION TEMPERATURE  5.0  C


  CHLOROPHYLL :      .51        RNA      :    15.08        PHOSPHATE   :     .27

  CARBON      :    87.00        DNA      :     5.38        NITRATE     :     .14

  NITROGEN    :     9.00        ATP      :     2.08        SILICATE    :    9.32

  PROTEIN     :   171.20        UREA     :      .27        AMMONIA     :     .16
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                              EASTERN ARCTIC 1980

LAT 54 31.10'N        LONG 56 48.90'W          DATE 22 07 80     DEPTH    4M
------------------------------------------------------------------------------
   I            P           I            P          I            P           I            P
------------------------------------------------------------------------------

698.2        1.55       698.2        1.58      613.5        1.22       571.2        1.68
518.3        2.50       444.3        1.71      444.3        2.42       363.9        2.26
342.7        2.62       300.4        2.37      245.4        2.32       224.3        2.77
186.2        2.54       169.3        2.39      160.8        2.79       160.8        2.48
114.2        2.34       114.2        2.58       88.9        2.49        69.8        2.43
 59.2        2.56        52.9        2.47       42.3        2.35        37.2        2.38
 31.3        2.32        25.4        2.16       22.8        2.21        14.8        1.59
 12.3        1.48         9.7        1.11        9.1        1.30         6.6         .82
  6.1         .86         5.4         .64        5.0         .77         3.2         .36
  2.6         .48         2.2         .32        2.1         .30         1.7         .29
  1.4         .19         1.1         .31        1.1         .23

                              PARAMETER VALUES

        PS :       2.82            ALPHA :       .163             BETA :     .0021

       (  2.73,    2.92 )         ( .151, .175 )              (   .0017,   .0024 )

   SAMPLE TEMPERATURE   7.5   C              INCUBATION TEMPERATURE   2.0   C


  CHLOROPHYLL :       .51      RNA      :   15.08      PHOSPHATE     :      .27

  CARBON      :     87.00      DNA      :    5.38      NITRATE       :      .14

  NITROGEN    :      9.00      ATP      :    2.08      SILICATE      :     9.32

  PROTEIN     :    171.20      UREA     :     .27      AMMONIA       :      .16
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                              EASTERN ARCTIC 1980

LAT 54 31.10'N        LONG 56 48.90'W         DATE 22 07 80     DEPTH   4M
--------------------------------------------------------------------------------
    I           P        I            P        I           P        I           P
--------------------------------------------------------------------------------

 698.2         .53     613.5         .08     571.2         .65     465.4         .65
 444.3        1.28     370.2        1.29     308.9        1.44     296.2        1.83
 296.2        1.05     237.0        1.96     220.0        1.76     211.6        1.76
 146.0        1.86     120.6        2.01     112.6        2.06      88.9        1.71
  88.9        1.65      63.5        1.47      52.9        1.76      50.8        1.89
  41.9        1.76      36.8        1.66      30.5        1.75      25.8        1.51
  22.0        1.08      15.7        1.10      14.0         .96      10.4         .15
  10.4         .93       8.3         .50       7.8         .38       5.7         .21
   5.7         .41       3.5         .11       3.2         .19       2.2         .09
   2.2         .08       1.6         .02       1.5         .02       1.2         .00
   1.0         .03


                              PARAMETER VALUES

        PS :      2.75           ALPHA :      .072           BETA :    .0064

       ( 2.47,  3.02 )          ( .065, .079 )          (  .0048,   .0080 )

   SAMPLE TEMPERATURE  7.5  C              INCUBATION TEMPERATURE  0.0  C


  CHLOROPHYLL :     .51      RNA    :   15.08      PHOSPHATE   :      .27

  CARBON      :   87.00      DNA    :    5.38      NITRATE     :      .14

  NITROGEN    :    9.00      ATP    :    2.08      SILICATE    :     9.32

  PROTEIN     :  171.20      UREA   :     .27      AMMONIA     :      .16
```

EASTERN ARCTIC 1980

LAT 60 21.90'N LONG 61 14.40'W DATE 25 07 80 DEPTH 22M

I	P	I	P	I	P	I	P
854.7	1.22	833.6	1.36	761.6	1.25	744.7	.98
736.2	1.46	689.7	1.18	626.2	1.56	503.5	1.36
490.8	1.33	490.8	1.57	478.1	1.33	355.4	1.55
347.0	1.38	338.5	1.07	169.3	1.44	156.6	1.44
110.0	1.41	107.9	1.67	77.0	1.43	69.8	1.70
61.4	1.22	57.5	1.22	47.4	1.21	36.0	1.07
34.7	.96	23.7	.50	22.8	.71	15.7	.45
15.4	.32	11.2	.19	10.3	.34	7.8	.24
7.5	.15	5.3	.05	4.9	.22	3.5	.08
3.3	.07	2.8	.02	2.3	.02	1.9	.00
1.8	.01						

PARAMETER VALUES

PS :	1.65	ALPHA :	.040	BETA :	.0006
	(1.55, 1.76)		(.036, .044)		(.0004, .0008)

SAMPLE TEMPERATURE 3.0 C INCUBATION TEMPERATURE 6.0 C

CHLOROPHYLL :	.88	RNA :	13.01	PHOSPHATE :	.23
CARBON :	141.00	DNA :	5.92	NITRATE :	.12
NITROGEN :	14.00	ATP :	1.20	SILICATE :	3.97
PROTEIN :	209.00	UREA :	.64	AMMONIA :	.58

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                              EASTERN ARCTIC 1980

 LAT 53 21.90'N        LONG 61 14.40'W          DATE 25 07 80    DEPTH  22M
---------------------------------------------------------------------------------
    I            P          I           P          I          P         I           P
---------------------------------------------------------------------------------

867.4          .69      812.4         .45      812.4        .55     723.6         .78
655.9          .56      643.2         .65      634.7        .87     558.5         .79
507.8          .63      406.2         .62      317.3        .62     313.1         .74
304.7          .56      232.7         .53      211.6        .71     156.6         .58
110.0          .57       81.2         .82       72.4        .50      68.5         .59
 57.1          .73       45.3         .69       40.2        .70      34.7         .56
 31.7          .67       20.7         .50       19.0        .47      13.5         .30
 12.7          .45       10.2         .24        9.3        .30       4.7         .21
  4.7          .20        4.4         .04        3.8        .07       3.0         .11
  3.0          .17        2.3         .02        1.9        .01       1.5         .01
  1.4          .02


                                PARAMETER VALUES

          PS :       .66            ALPHA :      .042              BETA :    .0000

         (    .63,    .70 )         ( .036, .047 )             ( -.0001,   .0001 )

    SAMPLE TEMPERATURE  3.0  C                  INCUBATION TEMPERATURE  4.5  C


   CHLOROPHYLL :       .88        RNA     :    13.01        PHOSPHATE    :     .23

   CARBON      :   141.00         DNA     :     5.92        NITRATE      :     .12

   NITROGEN    :    14.00         ATP     :     1.20        SILICATE     :    3.97

   PROTEIN     :   209.00         UREA    :      .64        AMMONIA      :     .58
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                         EASTERN ARCTIC 1980

LAT 60 21.90'N      LONG 61 14.40'W        DATE 25 07 80     DEPTH  22M
------------------------------------------------------------------------------
   I          P          I          P          I          P          I          P
------------------------------------------------------------------------------

 736.2       .93       689.7       .94       600.8       .81       583.9       1.06
 537.4       .74       490.8       .81       444.3       .79       359.7       1.01
 355.4       .72       321.6       .79       262.3       .81       249.6        .89
 228.5       .92       190.4       .96       177.7      1.02       137.5        .90
 120.6      1.10        98.2       .69        81.2       .97        70.7        .81
  60.1       .80        53.7       .96        47.8       .81        38.9        .88
  34.7       .82        29.6       .91        26.2       .74        17.3        .48
  15.2       .57        11.4       .39        11.2       .48         7.9        .49
   7.7       .23         5.7       .22         5.6       .25         3.9        .12
   3.3       .14         2.6       .12         2.5       .13         1.8        .04
   1.8       .07         1.4       .04         1.3       .08

                          PARAMETER VALUES

        PS :      .91          ALPHA :      .055          BETA :    .0001

       (   .88,   .95 )        ( .049, .060 )          ( 0.0000,   .0002 )

  SAMPLE TEMPERATURE  3.0  C             INCUBATION TEMPERATURE  2.0  C


 CHLOROPHYLL :      .88      RNA     :   13.01      PHOSPHATE    :      .23

 CARBON      :   141.00      DNA     :    5.92      NITRATE      :      .12

 NITROGEN    :    14.00      ATP     :    1.20      SILICATE     :     3.97

 PROTEIN     :   209.00      UREA    :     .64      AMMONIA      :      .58
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                            EASTERN ARCTIC 1980

LAT 60 21.90'N       LONG 61 14.40'W         DATE 25 07 80    DEPTH  22M
------------------------------------------------------------------------------
   I            P            I            P            I            P            I            P
------------------------------------------------------------------------------

 740.5         .67        677.0          .58       613.5          .70       600.8          .55
 473.9         .51        435.8          .62       359.7          .55       317.3          .88
 317.3         .61        279.3          .65       220.0          .83       190.4          .82
 150.2         .83        139.6          .85       118.5          .75        97.3          .86
  73.6         .84         69.0          .82        59.2          .82        49.9          .63
  42.3         .63         34.3          .58        31.7          .76        25.0          .61
  23.3         .57         17.8          .42        15.7          .40        12.5          .33
  12.1         .42          8.5          .28         8.3          .28         6.2          .22
   5.7         .17          3.6          .09         3.3          .05         2.5          .02
   2.2         .01          1.7          .04         1.7          .03         1.6          .04
   1.2         .03


                              PARAMETER VALUES

        PS :      .96              ALPHA :      .037              BETA :    .0005

       (    .82,    .90 )          ( .034, .040 )               (  .0003,   .0006 )

   SAMPLE TEMPERATURE  3.0  C                  INCUBATION TEMPERATURE  0.0  C


  CHLOROPHYLL :      .88        RNA     :   13.01         PHOSPHATE   :      .23

  CARBON      :  141.00         DNA     :    5.92         NITRATE     :      .12

  NITROGEN    :   14.00         ATP     :    1.20         SILICATE    :     3.97

  PROTEIN     :  209.00         UREA    :     .64         AMMONIA     :      .58
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                              EASTERN ARCTIC 1980

LAT 63 31.10'N        LONG 58 47.80'W          DATE 26 07 80     DEPTH  29M
--------------------------------------------------------------------------------
   I           P           I           P          I           P          I           P
--------------------------------------------------------------------------------

867.4        .39      825.1         .39      761.6         .44      761.6         .48
698.2        .89      634.7         .50      624.1         .64      603.0         .63
518.3       1.11      465.4        1.14      444.3        1.12      385.0        1.42
363.9       1.25      313.1        1.31      258.1        1.33      241.2        1.30
194.6       1.46      169.3        1.42      139.6        1.64      121.4        1.29
107.9       1.23       91.0        1.39       61.4        1.23       55.0        1.31
 41.0       1.25       36.8         .96       27.5         .83       23.7         .65
 18.6        .62       16.9         .45       16.1         .45       11.8         .36
 10.6        .33        8.9         .19        7.6         .24        5.3         .14
  4.9        .04        3.3         .07        3.1         .11        2.7         .03
  2.6        .08        2.0         .07        1.8         .04

                              PARAMETER VALUES

      PS :      2.17             ALPHA :       .035              BETA :     .0038

    (  2.00,   2.33 )          ( .033, .038 )              (  .0031,   .0044 )

  SAMPLE TEMPERATURE   4.0   C                 INCUBATION TEMPERATURE   8.0   C


CHLOROPHYLL :      .45        RNA      :     5.67       PHOSPHATE    :     .58

CARBON      :    82.00        DNA      :     3.50       NITRATE      :     .63

NITROGEN    :      -          ATP      :      .92       SILICATE     :    3.51

PROTEIN     :   105.10        UREA     :      .73       AMMONIA      :     .48
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                              EASTERN ARCTIC 1980

 LAT 63 31.10'N        LONG 58 47.80'W         DATE 26 07 80     DEPTH   29M
-------------------------------------------------------------------------------
     I          P          I          P          I          P          I          P
-------------------------------------------------------------------------------

 825.1        .02      793.4        .29      770.1        .19      719.3        .19
 613.5        .45      613.5        .32      592.4        .38      541.6        .68
 497.2        .69      465.4        .73      397.7        .90      363.9        .98
 330.0        .83      292.0       1.00      266.6       1.10      230.6        .98
 213.7       1.18      169.3       1.24      124.8       1.20      107.9       1.46
  78.3       1.14       63.5       1.33       55.0        .93       33.4       1.05
  28.9       1.17       22.4       1.00       21.2        .90       18.2        .77
  15.7        .60       13.3        .42       12.5        .33        9.9        .32
   9.1        .34        7.0        .15        6.6        .19        4.1        .13
   3.6        .16        2.6        .12        2.4        .07        1.9        .04
   1.6        .07        1.6        .00        1.6        .01

                              PARAMETER VALUES

        PS :      1.87          ALPHA :      .047           BETA :     .0044

       ( 1.73,  2.02 )         ( .044, .051 )           (  .0036,  .0052 )

  SAMPLE TEMPERATURE  4.0  C              INCUBATION TEMPERATURE  5.5  C


  CHLOROPHYLL :      .45      RNA     :    5.67      PHOSPHATE   :     .58

  CARBON      :    82.00      DNA     :    3.50      NITRATE     :     .63

  NITROGEN    :      -        ATP     :     .92      SILICATE    :    3.51

  PROTEIN     :   105.10      UREA    :     .73      AMMONIA     :     .48
```

EASTERN ARCTIC 1980

LAT 63 31.10'N LONG 58 47.80'W DATE 26 07 80 DEPTH 29M

I	P	I	P	I	P	I	P
782.8	.08	719.3	.09	624.1	.12	613.5	.06
613.5	.25	454.9	.27	359.7	.26	342.7	.46
334.3	.36	245.4	.47	237.0	.55	198.9	.58
190.4	.63	152.3	.75	122.7	.69	105.8	.71
93.9	.66	78.3	.64	65.6	.60	59.2	.68
47.4	.59	44.4	.68	34.3	.61	33.9	.55
27.5	.54	24.5	.44	16.1	.39	15.2	.39
11.0	.29	1.2	.33				

PARAMETER VALUES

PS :	1.02	ALPHA :	.029	BETA :	.0030
	(.92, 1.12)		(.026, .032)		(.0023, .0037)

SAMPLE TEMPERATURE 4.0 C

INCUBATION TEMPERATURE 2.0 C

CHLOROPHYLL :	.45	RNA :	5.67	PHOSPHATE :	.58
CARBON :	82.00	DNA :	3.50	NITRATE :	.63
NITROGEN :	-	ATP :	.92	SILICATE :	3.51
PROTEIN :	105.10	UREA :	.73	AMMONIA :	.48

```
                          EASTERN ARCTIC 1980

 LAT 63 31.10'N      LONG 58 47.80'W        DATE 26 07 80    DEPTH  29M
------------------------------------------------------------------------------
   I           P        I            P        I            P        I          P
------------------------------------------------------------------------------

 751.1        .08     719.3         .04     613.5         .02     581.8        .06
 486.6        .06     465.4         .11     444.3         .03     389.3        .06
 311.0        .15     300.4         .07     270.8         .11     220.0        .21
 215.8        .17     181.9         .09     173.5         .34     137.5        .30
 105.8        .32     101.6         .32      81.7         .40      65.6        .26
  59.2        .29      52.9         .22      49.9         .30      37.2        .22
  32.6        .32      24.5         .33      24.5         .24      14.4        .31
  14.0        .18      11.6         .17      10.8         .24       8.3        .20
   7.4        .15       6.6         .15       5.3         .14       3.2        .08
   3.2        .05       2.3         .05       2.0         .04       1.7        .10
   1.5        .06       1.5         .03       1.1         .08

                           PARAMETER VALUES

        PS :      .38          ALPHA :      .028          BETA :    .0013

       (    .35,    .41 )     ( .024, .032 )          (  .0010,  .0016 )

  SAMPLE TEMPERATURE  4.0  C             INCUBATION TEMPERATURE  -2.0 C


  CHLOROPHYLL :      .45      RNA     :    5.67      PHOSPHATE  :      .58

  CARBON      :    82.00      DNA     :    3.50      NITRATE    :      .63

  NITROGEN    :      -        ATP     :     .92      SILICATE   :     3.51

  PROTEIN     :   105.10      UREA    :     .73      AMMONIA    :      .48
```

```
                              EASTERN ARCTIC 1980

LAT 64 02.80'N        LONG 58 17.50'W         DATE 26 07 80     DEPTH  29M
------------------------------------------------------------------------------
    I           P           I          P          I          P          I          P
------------------------------------------------------------------------------

871.6         .06       829.3        .24      748.9        .19      638.9        .36
638.9,        .18       613.5        .28      571.2        .45      533.1        .58
495.1         .42       380.8        .93      380.8        .85      334.3        .77
300.4         .76       190.4        .74      162.9        .71      126.9        .78
101.6        1.01        76.2       1.02       69.8        .81       57.5        .88
 48.7         .70        41.0        .52       31.3        .47       31.3        .51
 19.9         .36        19.5        .28       14.4        .41       14.0        .48
 10.2         .27        10.0        .17        7.8        .17        7.3        .00
  4.7         .00         4.6        .00        3.4        .03        3.1        .00
  2.4         .00         2.3        .00        1.8        .00        1.6        .00


                                PARAMETER VALUES

        PS :      1.54           ALPHA :      .021            BETA :    .0036

       (  1.25,   1.83 )         ( .019, .024 )            (  .0022,  .0049 )


 SAMPLE TEMPERATURE  4.5  C                INCUBATION TEMPERATURE  7.2  C


 CHLOROPHYLL :      .22        RNA    :    5.92        PHOSPHATE   :     .62

 CARBON      :    55.00        DNA    :    2.96        NITRATE     :     .00

 NITROGEN    :     3.00        ATP    :     .65        SILICATE    :    1.78

 PROTEIN     :    52.60        UREA   :     .22        AMMONIA     :     .00
```

```
                              EASTERN ARCTIC 1980

 LAT 64 02.80'N      LONG 58 17.50'W        DATE 26 07 80    DEPTH  29M
--------------------------------------------------------------------------------
    I           P         I           P         I           P         I           P
--------------------------------------------------------------------------------

 820.9         .04      795.5        .01      702.4        .06      698.2        .06
 605.1         .16      605.1        .29      533.1        .28      444.3        .48
 435.8         .49      332.2        .61      308.9        .72      249.6        .64
 241.2         .65      184.1        .73      141.7        .69      121.0        .80
  93.1         .84       68.1        .80       59.2        .75       48.7        .70
  39.5         .72       28.4        .63       24.1        .57       18.6        .46
  14.8         .48       12.3        .37       11.4        .23        8.7        .11
   8.5         .23        6.3        .35        5.3        .14        3.6        .18
   3.3         .10        2.6        .07        2.4        .00        1.7        .00
   1.6         .00        1.3        .00        1.2        .00


                              PARAMETER VALUES

        PS :      1.22          ALPHA :       .031          BETA :     .0033

      (  1.10,  1.33 )        ( .028, .034 )         (  .0026,  .0039 )

  SAMPLE TEMPERATURE  4.5  C               INCUBATION TEMPERATURE  5.0  C


  CHLOROPHYLL :      .22        RNA      :     5.92       PHOSPHATE    :      .62

  CARBON      :    55.00        DNA      :     2.96       NITRATE      :      .00

  NITROGEN    :     3.00        ATP      :      .65       SILICATE     :     1.78

  PROTEIN     :    52.60        UREA     :      .22       AMMONIA      :      .00
```

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                              EASTERN ARCTIC 1980

   LAT 64 02.80'N      LONG 58 17.50'W        DATE 26 07 80    DEPTH  29M
 ----------------------------------------------------------------------------
      I          P          I          P          I          P          I          P
 ----------------------------------------------------------------------------

   736.2        .12      719.3        .10      605.1        .12      592.4        .07
   592.4        .30      486.6        .19      452.7        .19      402.0        .40
   334.3        .55      330.0        .21      283.5        .43      245.4        .30
   198.9        .64      192.5        .72      165.0        .42      139.6        .69
   135.4        .80      100.3        .54       99.9        .77       68.5        .81
    55.9        .91       51.2        .55       38.5        .83       36.0        .62
    27.5        .52       16.5        .27       15.7        .34       12.5        .15
    11.4        .25        8.7        .22        7.4        .15        6.2        .00
     5.4        .01        3.6        .05        3.4        .05        2.6        .00
     2.4        .06        1.7        .00        1.6        .00        1.3        .00
     1.2        .00


                               PARAMETER VALUES

          PS :      1.18           ALPHA :       .027             BETA :    .0041

         (    .98,   1.38 )        ( .023, .030 )             (  .0027,   .0056 )


    SAMPLE TEMPERATURE   4.5  C              INCUBATION TEMPERATURE  3.1  C


   CHLOROPHYLL :      .22       RNA     :     5.92       PHOSPHATE   :      .62

   CARBON      :    55.00       DNA     :     2.96       NITRATE     :      .00

   NITROGEN    :     3.00       ATP     :      .65       SILICATE    :     1.78

   PROTEIN     :    52.60       UREA    :      .22       AMMONIA     :      .00
```

EASTERN ARCTIC 1980

LAT 64 02.80'N LONG 58 17.50'W DATE 26 07 80 DEPTH 29M

I	P	I	P	I	P	I	P
770.1	.06	719.3	.08	634.7	.11	579.7	.16
495.1	.09	465.4	.17	452.7	.15	389.3	.15
340.6	.16	321.6	.19	317.3	.24	220.0	.23
211.6	.35	165.0	.26	148.1	.55	107.9	.43
103.7	.48	86.3	.65	77.0	.43	63.5	.61
61.4	.32	47.8	.56	41.0	.45	34.3	.38
29.2	.32	25.8	.36	16.9	.38	15.2	.40
11.7	.23	11.3	.32	7.6	.18	7.4	.13
5.8	.14	5.2	.11	3.1	.11	3.0	.03
2.2	.14	2.1	.00	1.6	.01	1.4	.08
1.2	.02	1.0	.05				

PARAMETER VALUES

PS :	.66	ALPHA :	.028	BETA :	.0022
	(.59, .73)		(.024, .031)		(.0017, .0028)

SAMPLE TEMPERATURE 4.5 C

INCUBATION TEMPERATURE -0.2 C

CHLOROPHYLL :	.22	RNA :	5.92	PHOSPHATE :	.62
CARBON :	55.00	DNA :	2.96	NITRATE :	.00
NITROGEN :	3.00	ATP :	.65	SILICATE :	1.78
PROTEIN :	52.60	UREA :	.22	AMMONIA :	.00

```
                                  EASTERN ARCTIC 1980

 LAT 67 22.00'N        LONG 56 26.00'W         DATE 27 07 80     DEPTH    5M
-------------------------------------------------------------------------------------
      I          P          I          P          I          P          I          P
-------------------------------------------------------------------------------------

 854.7        1.03      837.8         .86     761.6         .93     744.7         .97
 655.9        1.10      634.7        1.32     613.5        1.03     550.1         .88
 550.1        1.27      524.7        1.20     473.9        1.20     406.2        1.33
 330.0        1.10      313.1        1.26     232.7        1.23     196.8        1.35
 165.0        1.21      143.9        1.33     106.6        1.37      98.6        1.22
  72.8        1.38       62.6        1.28      52.9        1.25      44.4        1.09
  39.8         .97       30.9         .91      29.2         .82      20.7         .51
  16.9         .49       14.0         .30      13.5         .36      10.2         .14
   9.3         .23        7.2         .13       6.9         .12       4.7         .05
   4.3         .10        3.2         .05       3.1         .08       2.3         .02
   2.2         .00        1.7         .01       1.5         .00

                                  PARAMETER VALUES

        PS :      1.51           ALPHA :       .038             BETA :    .0008

       ( 1.43,  1.58 )          ( .035, .041 )             (  .0006,   .0010 )

  SAMPLE TEMPERATURE  5.5  C              INCUBATION TEMPERATURE  6.5  C


  CHLOROPHYLL :      .51       RNA     :   10.24       PHOSPHATE   :      .73

  CARBON      :  105.00        DNA     :    4.75       NITRATE     :      .18

  NITROGEN    :   17.00        ATP     :    1.51       SILICATE    :     1.86

  PROTEIN     :  145.90        UREA    :     .41       AMMONIA     :      .00
```

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                         EASTERN ARCTIC 1980

LAT 67 22.00'N      LONG 56 26.00'W       DATE 27 07 80    DEPTH  35M
-------------------------------------------------------------------------
   I          P         I          P         I          P         I          P
-------------------------------------------------------------------------

850.5       .23      825.1       .19      791.3       .21      740.5       .16
643.2       .54      613.5       .34      592.4       .31      528.9       .44
490.8       .65      457.0       .71      440.1       .75      385.0      1.03
330.0       .91      275.0       .85      249.6       .92      184.1       .76
160.8      1.21      122.7      1.06      103.7      1.04       76.6      1.16
 66.9      1.11       55.0      1.09       48.7      1.24       38.5       .94
 34.7      1.26       27.9      1.00       26.7      1.03       16.1       .66
 15.2       .60       11.4       .34       11.1       .41        8.2       .25
  8.1       .23        6.3       .17        5.8       .25        3.6       .06
  3.5       .09        2.5       .00        2.4       .06        1.7       .01
  1.7       .05        1.3       .02        1.2       .01

                          PARAMETER VALUES

       PS :     1.50          ALPHA :     .052          BETA :    .0030

     ( 1.39,  1.61 )        ( .047, .057 )          (  .0025,  .0035 )

 SAMPLE TEMPERATURE  4.5  C             INCUBATION TEMPERATURE  5.0  C


CHLOROPHYLL :    1.19      RNA     :    8.03      PHOSPHATE   :     .62

CARBON      :   82.00      DNA     :    7.79      NITRATE     :    1.55

NITROGEN    :     -        ATP     :    1.07      SILICATE    :    2.65

PROTEIN     :  120.80      UREA    :    1.23      AMMONIA     :     .95
```

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                          EASTERN ARCTIC 1980

  LAT 67 22.00'N      LONG 56 26.00'W        DATE 27 07 80    DEPTH  64M
-------------------------------------------------------------------------------
     I          P          I          P          I          P          I          P
-------------------------------------------------------------------------------

  765.9        .03       719.3       .04       609.3       .05       583.9       .03
  507.8        .07       452.7       .02       418.9       .08       338.5       .05
  332.2        .04       304.7       .04       262.3       .10       253.9       .09
  203.1        .07       181.9       .09       165.0       .11       133.3       .12
  119.7        .11        90.6       .08        68.5       .12        65.6       .11
   49.7        .11        47.8       .14        36.4       .13        34.7       .04
   25.0        .08        23.7       .05        16.1       .06        13.1       .05
   12.3        .04         9.8       .07         7.7       .00         7.3       .03
    5.6        .01         5.5       .02         3.5       .00         3.3       .01
    2.5        .01         2.4       .00         1.7       .01         1.6       .00
    1.3        .00         1.2       .00

                            PARAMETER VALUES

           PS :       .15          ALPHA :      .004            BETA :    .0004

         (    .12,     .19 )       ( .003, .005 )            (  .0002,   .0006 )

    SAMPLE TEMPERATURE   3.0   C              INCUBATION TEMPERATURE   2.5   C


   CHLOROPHYLL :      .19       RNA     :      -        PHOSPHATE    :      .98

   CARBON      :   82.00        DNA     :    1.81       NITRATE      :     4.70

   NITROGEN    :      -         ATP     :     .36       SILICATE     :     4.63

   PROTEIN     :   18.80        UREA    :     .95       AMMONIA      :     2.92
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                              EASTERN ARCTIC 1980

LAT 68 02.90'N        LONG 56 15.30'W         DATE 27 07 80    DEPTH   1M
---------------------------------------------------------------------------
    I             P        I             P        I            P        I            P
---------------------------------------------------------------------------

846.3          .37     803.9           .31     761.6          .43     719.3          .33
698.2          .48     677.0           .42     634.7          .37     592.4          .51
528.9          .52     486.6           .50     465.4          .48     410.4          .58
389.3          .57     359.7           .62     283.5          .60     215.8          .59
160.8          .56     131.2           .50     114.2          .65      80.4          .51
 76.2          .61      59.2           .48      55.0          .46      38.9          .59
 34.7          .53      27.5           .50      24.1          .33      16.9          .22
 15.2          .20      13.1           .13      12.1          .14       9.5          .12
  8.3          .08       6.8           .10       6.1          .09       4.1          .05
  3.7          .05       2.8           .01       2.8          .04       2.2          .02
  1.9          .03       1.6           .00       1.4          .00

                              PARAMETER VALUES

         PS :       .70            ALPHA :       .019            BETA :    .0005

        (    .65,    .74 )        ( .017, .021 )           (  .0004,   .0006 )

  SAMPLE TEMPERATURE  4.5  C                 INCUBATION TEMPERATURE  6.0  C


 CHLOROPHYLL :      .55        RNA     :    4.51       PHOSPHATE    :     .56

 CARBON      :    83.00        DNA     :    3.46       NITRATE      :     .01

 NITROGEN    :     4.00        ATP     :    1.01       SILICATE     :    2.53

 PROTEIN     :   136.90        UREA    :     .23       AMMONIA      :     .09
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                              EASTERN ARCTIC 1980

LAT 68 02.90'N       LONG 56 15.30'W          DATE 27 07 80     DEPTH   1M
--------------------------------------------------------------------------------
    I            P            I          P          I          P          I          P
--------------------------------------------------------------------------------

825.1         .28     782.8          .17     740.5          .31     655.9          .35
655.9         .24     634.7          .35     613.5          .34     550.1          .38
448.5         .39     444.3          .41     380.8          .42     317.3          .45
292.0         .38     249.6          .44     245.4          .52     198.9          .35
173.5         .59     152.3          .56     122.7          .54      97.3          .43
 71.9         .46      63.5          .40      52.9          .47      46.5          .40
 39.8         .40      30.9          .30      28.4          .32      17.8          .21
 16.5         .25      11.4          .12      10.2          .14       8.9          .09
  8.3         .09       6.3          .05       6.3          .06       3.4          .02
  3.3         .02       2.7          .00       2.5          .00       2.1          .01
  1.9         .01       1.4          .01       1.3          .00


                              PARAMETER VALUES

         PS :       .61            ALPHA :      .015             BETA :    .0006

        (   .57,    .64 )           ( .014, .016 )            (  .0005,   .0007 )


  SAMPLE TEMPERATURE  4.5  C                INCUBATION TEMPERATURE  4.5  C


 CHLOROPHYLL :      .55       RNA      :     4.51       PHOSPHATE    :      .56

 CARBON      :    83.00       DNA      :     3.46       NITRATE      :      .01

 NITROGEN    :     4.00       ATP      :     1.01       SILICATE     :     2.53

 PROTEIN     :   136.90       UREA     :      .23       AMMONIA      :      .09
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                         EASTERN ARCTIC 1980

LAT 68 02.90'N      LONG 56 15.30'W        DATE 27 07 80    DEPTH   1M
----------------------------------------------------------------------------
  I           P          I           P          I           P          I           P
----------------------------------------------------------------------------

825.1        .14       719.3        .17       645.3        .19       571.2        .28
550.1        .20       476.0        .20       433.7        .25       406.2        .25
372.4        .25       300.4        .30       262.3        .26       220.0        .30
215.8        .32       196.8        .31       156.6        .33       152.3        .29
126.9        .33       107.9        .29        93.1        .28        71.9        .30
 63.5        .30        52.9        .30        49.5        .30        38.9        .24
 36.0        .22        27.1        .18        26.7        .23        15.2        .11
 14.0        .08        11.4        .06        11.0        .07         7.4        .06
  7.4        .00         5.5        .05         5.5        .04         3.1        .00
  3.0        .03         2.4        .00         2.2        .00         1.6        .00
  1.5        .02         1.1        .00         1.1        .02

                          PARAMETER VALUES

        PS :       .38          ALPHA :      .010           BETA :    .0004

       (   .36,   .40 )        ( .009, .010 )          (  .0003,  .0005 )

  SAMPLE TEMPERATURE  4.5  C               INCUBATION TEMPERATURE  1.5  C


  CHLOROPHYLL :      .55       RNA     :    4.51       PHOSPHATE  :      .56

  CARBON      :    83.00       DNA     :    3.46       NITRATE    :      .01

  NITROGEN    :     4.00       ATP     :    1.01       SILICATE   :     2.53

  PROTEIN     :   136.90       UREA    :     .23       AMMONIA    :      .09
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                              EASTERN ARCTIC 1980

   LAT 68 02.90'N       LONG 56 15.30'W        DATE 27 07 80    DEPTH   1M
 ----------------------------------------------------------------------------
      I           P          I          P          I          P          I          P
 ----------------------------------------------------------------------------

   613.5        .06      528.9        .11      476.0        .17      465.4        .07
   444.3        .14      376.6        .13      292.0        .20      279.3        .22
   198.9        .23      194.6        .27      177.7        .23      143.9        .25
   118.5        .24       97.3        .23       91.0        .18       71.9        .17
    59.2        .23       57.1        .24       44.4        .20       38.1        .22
    30.9        .23       28.4        .20       22.0        .20       21.6        .16
    14.8        .16       12.7        .13        9.5        .11        9.1        .09
     7.0        .07        6.3        .11        4.5        .06        4.4        .07
     2.6        .02        2.4        .04        1.9        .00        1.7        .02
     1.4        .02        1.3        .01        1.0        .03         .9        .05


                              PARAMETER VALUES

           PS :       .27            ALPHA :      .014             BETA :     .0004

          (    .26,    .29 )        ( .013, .016 )             (  .0003,   .0005 )


    SAMPLE TEMPERATURE   4.5  C                   INCUBATION TEMPERATURE  -1.0 C


   CHLOROPHYLL :      .55         RNA      :     4.51        PHOSPHATE   :      .56

   CARBON      :   83.00          DNA      :     3.46        NITRATE     :      .01

   NITROGEN    :    4.00          ATP      :     1.01        SILICATE    :     2.53

   PROTEIN     :  136.90          UREA     :      .23        AMMONIA     :      .09
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                              EASTERN ARCTIC 1980

LAT 74 55.00'N       LONG 64 32.00'W          DATE 29 07 80     DEPTH  10M
----------------------------------------------------------------------------------
    I            P          I            P          I            P          I            P
----------------------------------------------------------------------------------

816.6          .86      791.3          .52      732.0          .66      702.4          .96
634.7         1.34      571.2         1.63      558.5         2.08      507.8         1.65
431.6         2.04      423.1         1.73      380.8         2.36      302.5         2.72
275.0         2.45      262.3         2.38      179.8         2.51      169.3         2.63
126.9         2.58      118.5         2.40       82.9         2.29       82.5         2.43
 61.4         2.00       58.0         2.55       47.4         2.35       41.0         1.80
 33.0         2.29       28.4         1.88       25.0         2.18       17.8         1.79
 16.1         1.77       12.1          .76       10.8         1.16        8.4          .80
  7.3          .90        6.0          .60        5.4          .98        3.4          .29
  3.1          .32        2.6          .14        2.4          .25        1.7          .00
  1.7          .03        1.4          .00        1.3          .04

                              PARAMETER VALUES

        PS :      3.07           ALPHA :      .117            BETA :     .0039

        (  2.88,  3.26 )         ( .105, .128 )           (  .0031,  .0046 )

 SAMPLE TEMPERATURE  -.5  C               INCUBATION TEMPERATURE  1.0  C


 CHLOROPHYLL :      .44        RNA      :   14.28       PHOSPHATE   :      .36

 CARBON      :  154.00        DNA      :    7.34       NITRATE     :      .32

 NITROGEN    :   32.00        ATP      :    1.85       SILICATE    :     3.92

 PROTEIN     :  261.40        UREA     :     .60       AMMONIA     :      .43
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                              EASTERN ARCTIC 1980

  LAT 74 55.00'N       LONG 64 32.00'W        DATE 29 07 80    DEPTH  25M
-------------------------------------------------------------------------------
     I           P          I           P          I           P          I           P
-------------------------------------------------------------------------------

  833.7         .08      799.8         .14      719.4         .24      719.4         .20
  639.0         .37      592.5         .53      537.5         .75      524.8         .62
  431.7         .75      364.0         .78      266.7         .64      230.7         .81
  220.1         .91      156.6         .91      119.4         .88       99.5         .88
   76.2        1.03       66.9         .94       56.8        1.21       47.5         .59
   39.9        1.02       33.5        1.09       29.3        1.00       24.6         .83
   22.9        1.04       14.9         .79       14.0         .81        9.6         .71
    8.8         .67        6.7         .61        6.5         .51        4.7         .43
    4.7         .39        2.7         .25        2.6         .18        1.9         .14
    1.9         .06        1.3         .08        1.3         .05        1.0         .00
    1.0         .06


                                PARAMETER VALUES

           PS :      1.10            ALPHA :      .105            BETA :    .0017

         (  1.05,  1.16 )          ( .093, .118 )            (  .0014,  .0020 )

    SAMPLE TEMPERATURE  -1.2 C                 INCUBATION TEMPERATURE  1.8  C


   CHLOROPHYLL :      .43        RNA     :     2.99        PHOSPHATE   :      .64

   CARBON      :    95.00        DNA     :     3.58        NITRATE     :     5.23

   NITROGEN    :      -          ATP     :     1.21        SILICATE    :     6.07

   PROTEIN     :   100.00        UREA    :      .36        AMMONIA     :      .36
```

EASTERN ARCTIC 1980

LAT 74 55.00'N LONG 64 32.00'W DATE 29 07 80 DEPTH 40M

I	P	I	P	I	P	I	P
803.9	.88	740.5	.92	634.7	.89	558.5	1.22
457.0	1.03	406.2	1.38	338.5	1.25	275.0	1.45
249.6	1.44	177.7	1.25	156.6	1.63	143.9	1.58
104.9	1.64	93.1	1.42	72.8	1.62	67.7	1.53
52.9	1.31	46.5	1.25	38.1	1.53	32.2	1.49
26.7	1.57	22.4	1.10	19.0	1.39	15.4	1.17
13.3	1.07	8.7	.78	7.8	.84	5.7	.69
5.7	.70	4.1	.39	3.8	.45	3.0	.25
2.6	.37	1.8	.18	1.6	.22	1.3	.22
1.2	.29	.9	.18	.9	.16	.7	.16
.6	.14						

PARAMETER VALUES

PS :	1.60	ALPHA :	.139	BETA :	.0011
(1.56,	1.65)	(.129,	.149)	(.0009,	.0013)

SAMPLE TEMPERATURE -1.0 C

INCUBATION TEMPERATURE -2.0 C

CHLOROPHYLL :	.34	RNA :	.48	PHOSPHATE :	.76
CARBON :	42.00	DNA :	2.01	NITRATE :	6.58
NITROGEN :	-	ATP :	1.07	SILICATE :	6.47
PROTEIN :	72.00	UREA :	.43	AMMONIA :	.27

EASTERN ARCTIC 1980

LAT 75 26.00'N LONG 65 52.50'W DATE 29 07 80 DEPTH 5M

I	P	I	P	I	P	I	P
825.1	.01	795.5	.01	702.4	.02	660.1	.02
626.2	.05	605.1	.01	469.7	.02	444.3	.01
385.0	.07	316.1	.06	287.7	.06	228.5	.09
208.2	.06	130.7	.07	102.4	.08	82.5	.09
72.8	.13	65.6	.10	52.0	.09	39.4	.10
34.3	.15	25.4	.12	22.9	.12	13.5	.13
11.8	.11	10.4	.13	9.0	.12	7.7	.07
6.7	.09	5.6	.10	4.5	.12	3.1	.06
2.8	.08	2.5	.06	2.1	.01	1.5	.04
1.3	.02	1.1	.03	.9	.00		

PARAMETER VALUES

PS :	.13	ALPHA :	.029	BETA :	.0004
	(.12, .14)		(.025, .034)		(.0003, .0004)

SAMPLE TEMPERATURE -0.5 C INCUBATION TEMPERATURE 0.0 C

CHLOROPHYLL :	.54	RNA :	8.66	PHOSPHATE :	.48
CARBON :	96.00	DNA :	4.90	NITRATE :	.18
NITROGEN :	18.00	ATP :	1.64	SILICATE :	4.30
PROTEIN :	193.30	UREA :	.04	AMMONIA :	.12

```
                          EASTERN ARCTIC 1980

 LAT 75 26.00'N      LONG 65 52.50'W       DATE 29 07 80    DEPTH  12M
-----------------------------------------------------------------------------
    I          P          I          P          I          P          I          P
-----------------------------------------------------------------------------

 816.6         .15     761.6        .00     672.8        .00     660.1        .21
 583.9         .22     528.9        .18     461.2        .36     385.0        .25
 272.9         .37     245.4        .40     243.3        .30     240.3        .36
 190.4         .39     184.1        .41     146.0        .41     129.1        .48
  99.9         .41      82.9        .50      66.0        .40      63.0        .55
  49.1         .49      33.4        .47      33.2        .42      25.8        .50
  24.8         .55      15.7        .38      15.2        .37      10.2        .35
  10.2         .23       7.4        .17       7.3        .26       5.5        .17
   5.3         .14       3.3        .10       3.0        .10       2.4        .04
   2.2         .05       1.7        .07       1.6        .03       1.2        .04
   1.2         .01


                            PARAMETER VALUES

         PS :       .58          ALPHA :      .039           BETA :    .0012

        (    .54,    .61 )        ( .035, .043 )          (  .0010,  .0014 )

  SAMPLE TEMPERATURE  -0.8 C              INCUBATION TEMPERATURE  0.0  C


 CHLOROPHYLL :      .68       RNA     :   12.69      PHOSPHATE   :      .37

 CARBON      :  130.00       DNA     :    8.58      NITRATE     :      .29

 NITROGEN    :   20.00       ATP     :    1.68      SILICATE    :     3.14

 PROTEIN     :  285.10       UREA    :     .27      AMMONIA     :      .22
```

```
                         EASTERN ARCTIC 1980

LAT 75 26.00'N       LONG 65 52.50'W        DATE 29 07 80     DEPTH  25M
--------------------------------------------------------------------------------
   I           P          I           P          I          P          I           P
--------------------------------------------------------------------------------

774.3         .04      744.7         .05      634.7        .04      617.8         .04
499.3         .13      486.6         .11      457.0        .16      448.5         .16
330.0         .15      304.7         .26      283.5        .13      243.3         .24
228.5         .19      177.7         .25      146.0        .14      120.6         .30
107.9         .29       84.6         .25       74.9        .27       59.2         .26
 42.3         .24       35.3         .25       31.1        .23       24.1         .26
 20.9         .22       14.8         .27       12.3        .15        9.7         .13
  9.1         .14        6.9         .11        6.8        .14        5.4         .13
  5.3         .13        3.2         .06        3.0        .05        2.4         .05
  2.3         .05        1.6         .02        1.6        .03        1.2         .02
  1.1         .02


                            PARAMETER VALUES

         PS :      .31           ALPHA :      .022           BETA :    .0006

        (   .29,    .33 )        ( .020, .025 )            (  .0005,  .0007 )

  SAMPLE TEMPERATURE  -1.0 C               INCUBATION TEMPERATURE  -1.0 C


 CHLOROPHYLL :      .77        RNA     :     9.39        PHOSPHATE   :      .48

 CARBON      :    61.00        DNA     :     4.93        NITRATE     :     2.43

 NITROGEN    :     3.00        ATP     :      .93        SILICATE    :     4.19

 PROTEIN     :   141.00        UREA    :      .07        AMMONIA     :      .36
```

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                              EASTERN ARCTIC 1980

 LAT 76 07.00'N        LONG 68 33.00'W          DATE 30 07 80      DEPTH  13M
---------------------------------------------------------------------------------
     I            P          I            P          I           P          I            P
---------------------------------------------------------------------------------

 867.4          .81       812.4          .78       740.5        .76       698.2          .94
 664.3         1.21       617.8         1.08       613.5       1.28       528.9         1.21
 402.0         1.29       330.0         1.35       296.2       1.13       262.3         1.08
 224.3         1.07       194.6         1.15       152.3       1.19       118.5         1.22
  90.1         1.24        82.5         1.22        63.5        .93        61.4         1.26
  46.5         1.20        43.2         1.16        33.4       1.08        26.7          .97
  24.5         1.04        16.1          .65        14.8        .64        11.6          .66
  11.0          .38         8.0          .24         7.8        .24         5.8          .15
   5.7          .22         3.4          .06         3.3        .06         2.4          .04
   2.3          .02         1.7          .01         1.5        .00         1.2          .00
   1.2          .00


                               PARAMETER VALUES

        PS :      1.33           ALPHA :      .055             BETA :     .0005

       ( 1.26,   1.39 )          ( .050, .061 )              (  .0004,   .0007 )

   SAMPLE TEMPERATURE  1.0  C              INCUBATION TEMPERATURE  2.0  C


  CHLOROPHYLL :     1.56        RNA     :     9.90        PHOSPHATE   :      .30

  CARBON      :   124.00        DNA     :     5.66        NITRATE     :      .16

  NITROGEN    :    26.00        ATP     :     1.04        SILICATE    :     1.95

  PROTEIN     :   163.80        UREA    :      .00        AMMONIA     :      .03
```

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                                 EASTERN ARCTIC 1980

LAT 76 07.00'N       LONG 68 33.00'W          DATE 30 07 80     DEPTH  13M
------------------------------------------------------------------------------
    I          P          I          P          I          P          I          P
------------------------------------------------------------------------------

825.1        1.51     740.5        1.84     719.3        1.58     592.4        1.75
571.2        1.96     558.5        1.87     452.7        1.73     435.8        1.85
423.1        1.81     355.4        1.51     300.4        2.08     287.7        1.85
226.4        1.81     207.3        1.90     169.3        1.76     108.3        1.75
 93.1        1.63      72.8        1.81      65.6        1.52      52.9        1.67
 44.4        1.52      38.1        1.45      32.6        1.35      25.0         .98
 22.4        1.14      14.4         .64      14.0         .76      10.0         .37
  9.5         .44       6.7         .28       6.4         .27       4.8         .05
  4.5         .19       3.0         .12       2.8         .08       2.1         .05
  1.5         .05       1.5         .02       1.1         .04       1.1         .01


                                 PARAMETER VALUES

          PS :     1.92          ALPHA :      .061          BETA :    .0003

        ( 1.85,  1.99 )        ( .057, .065 )          (  .0001,  .0005 )


   SAMPLE TEMPERATURE  1.0  C              INCUBATION TEMPERATURE  6.5  C


  CHLOROPHYLL :     1.56       RNA     :     9.90       PHOSPHATE    :      .30

  CARBON      :  124.00        DNA     :     5.66       NITRATE      :      .16

  NITROGEN    :   26.00        ATP     :     1.04       SILICATE     :     1.95

  PROTEIN     :  163.80        UREA    :      .00       AMMONIA      :      .03
```

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                         EASTERN ARCTIC 1980

 LAT 76 07.00'N      LONG 68 33.00'W      DATE 30 07 80    DEPTH  13M
-------------------------------------------------------------------------------
     I          P          I          P          I          P          I          P
-------------------------------------------------------------------------------

 761.6        .66      727.8        .67      643.2        .57      626.2        .85
 507.8        .78      495.1       1.09      448.5       1.05      368.1        .88
 334.3       1.03      325.8       1.01      232.7       1.26      188.3       1.14
 169.3        .99      160.8       1.11      122.7       1.10      105.8        .98
  90.1       1.18       76.6       1.02       58.4        .96       45.7       1.00
  43.2       1.04       32.2       1.08       31.3        .93       22.8        .83
  22.0        .82       13.1        .59       12.3        .59        8.9        .34
   6.3        .17        6.0        .26        4.6        .14        4.3        .13
   2.7        .06        2.6        .03        1.9        .06        1.9        .02
   1.4        .02        1.4        .02        1.0        .03         .9        .00


                          PARAMETER VALUES

        PS :     1.24           ALPHA :      .054           BETA :    .0009

      ( 1.19, 1.29 )          ( .049, .059 )           (  .0007,  .0011 )

   SAMPLE TEMPERATURE  1.0  C              INCUBATION TEMPERATURE  0.0  C


   CHLOROPHYLL :     1.68       RNA    :     9.90       PHOSPHATE    :     .30

   CARBON      :   124.00       DNA    :     5.66       NITRATE      :     .16

   NITROGEN    :    26.00       ATP    :     1.04       SILICATE     :    1.95

   PROTEIN     :   163.80       UREA   :      .00       AMMONIA      :     .03
```

EASTERN ARCTIC 1980

LAT 76 07.00'N LONG 68 33.00'W DATE 30 07 80 DEPTH 13M

I	P	I	P	I	P	I	P
736.2	.37	634.7	.44	583.9	.68	457.0	.57
427.4	.90	423.1	.90	347.0	.66	283.5	.94
249.6	.80	220.0	.74	198.9	.95	177.7	.83
156.6	.84	143.9	.84	118.5	.87	101.6	.87
73.2	.75	68.5	.88	58.0	.77	48.7	.81
41.5	.78	34.3	.91	26.7	.87	25.4	.79
20.3	.61	18.6	.71	11.6	.30	11.5	.32
8.2	.26	7.8	.22	5.6	.17	5.5	.17
4.5	.10	4.1	.06	2.5	.05	2.4	.05
1.8	.00	1.7	.04	1.3	.01	1.0	.04
.9	.00						

PARAMETER VALUES

PS :	.99	ALPHA :	.045	BETA :	.0009
	(.94, 1.05)		(.040, .050)		(.0006, .0011)

SAMPLE TEMPERATURE 1.0 C

INCUBATION TEMPERATURE -2.0 C

CHLOROPHYLL :	1.68	RNA :	9.90	PHOSPHATE :	.30
CARBON :	124.00	DNA :	5.66	NITRATE :	.16
NITROGEN :	26.00	ATP :	1.04	SILICATE :	1.95
PROTEIN :	163.80	UREA :	.00	AMMONIA :	.03

```
                          EASTERN ARCTIC 1980

LAT 75 46.40'N       LONG 69 09.20'W        DATE 31 07 80    DEPTH  13M
--------------------------------------------------------------------------------
    I          P          I          P          I          P          I          P
--------------------------------------------------------------------------------

761.6        .22       740.5       .11       689.7       .28       672.8       .31
630.5        .25       605.1       .47       520.5       .48       512.0       .69
473.9        .61       414.7       .67       359.7       .66       308.9       .80
283.5        .72       229.5       .66       224.3       .76       148.1       .79
139.6        .80        98.6       .72        86.3       .89        70.7       .72
 59.2        .81        50.8       .70        42.7       .68        33.9       .73
 29.6        .59        22.4       .67        17.3       .53        14.8       .52
 12.3        .37        10.2       .40         8.0       .31         7.4       .29
  5.9        .20         5.5       .19         3.7       .12         3.3       .12
  2.6        .05         2.3       .08         1.7       .03         1.6       .05
  1.2        .00         1.1       .03

                           PARAMETER VALUES

        PS :       .98          ALPHA :      .041           BETA :     .0014

       (   .92,   1.03 )        ( .037,  .044 )          (  .0011,   .0016 )

  SAMPLE TEMPERATURE  0.5  C               INCUBATION TEMPERATURE  3.0  C


 CHLOROPHYLL :       .72       RNA     :     7.11        PHOSPHATE   :       .32

 CARBON      :   111.00        DNA     :     6.21        NITRATE     :       .94

 NITROGEN    :    39.00        ATP     :     1.09        SILICATE    :      4.81

 PROTEIN     :   214.80        UREA    :      .28        AMMONIA     :       .24
```

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                              EASTERN ARCTIC 1980

LAT 75 46.40'N       LONG 69 09.20'W        DATE 31 07 80    DEPTH  13M
--------------------------------------------------------------------------------
    I            P           I           P           I           P           I           P
--------------------------------------------------------------------------------

803.9          .47     799.7         .48     719.3          .56     622.0         .79
579.7          .63     545.8         .58     440.1          .77     421.0         .80
410.4          .67     351.2         .91     287.7          .71     272.9         .90
218.8          .96     203.1         .95     155.7          .74     136.2         .80
104.9          .82     103.2         .89      68.5          .90      65.6         .76
 51.6          .80      45.7         .72      39.4          .69      30.5         .74
 27.1          .65      17.8         .46      16.5          .55      12.7         .35
 11.8          .31       8.4         .23       8.1          .24       6.1         .19
  5.9          .15       3.6         .06       3.6          .10       2.6         .04
  2.6          .04       1.9         .04       1.8          .09       1.4         .00
  1.3          .00


                              PARAMETER VALUES

        PS :      .99          ALPHA :      .035            BETA :     .0007

       (   .95,  1.04 )        ( .032, .038 )              (  .0006,   .0008 )

   SAMPLE TEMPERATURE  0.5  C               INCUBATION TEMPERATURE  1.0  C


  CHLOROPHYLL :      .72       RNA     :     7.11       PHOSPHATE    :      .32

  CARBON      :  111.00        DNA     :     6.21       NITRATE      :      .94

  NITROGEN    :   39.00        ATP     :     1.09       SILICATE     :     4.81

  PROTEIN     :  214.80        UREA    :      .28       AMMONIA      :      .24
```

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                          EASTERN ARCTIC 1980

LAT 75 46.40'N       LONG 69 09.20'W        DATE 31 07 80    DEPTH  13M
--------------------------------------------------------------------------------
   I          P         I          P         I          P        I          P
--------------------------------------------------------------------------------

748.9        .95     693.9        .99     600.8       1.08    550.1       1.23
507.9       1.19     457.0       1.30     338.5       1.30    304.7       1.32
270.8       1.54     245.4       1.39     241.2       1.24    192.5       1.52
181.9       1.35     156.6       1.29     111.3       1.27     86.7       1.35
 77.4       1.22      69.8       1.16      58.4       1.10     49.5        .92
 41.5        .93      33.0        .66      30.9        .65     23.7        .56
 23.3        .48      15.2        .30      11.4        .13     10.2        .16
  6.8        .10       6.8        .07       4.7        .07      4.7        .05
  3.0        .04       2.8        .07       2.0        .03      2.0        .00
  1.5        .04       1.5        .05       1.1        .05      1.1        .03


                            PARAMETER VALUES

        PS :      1.72         ALPHA :      .028          BETA :    .0013

        ( 1.64,   1.80 )       ( .027, .029 )         (  .0010,   .0015 )

   SAMPLE TEMPERATURE  0.5  C              INCUBATION TEMPERATURE  16.0 C


  CHLOROPHYLL :      .72      RNA     :     7.11      PHOSPHATE    :     .32

  CARBON      :  111.00      DNA     :     6.21      NITRATE      :     .94

  NITROGEN    :   39.00      ATP     :     1.09      SILICATE     :    4.81

  PROTEIN     :  214.80      UREA    :      .28      AMMONIA      :     .24
```

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                              EASTERN ARCTIC 1980

 LAT 75 46.40'N       LONG 69 09.20'W        DATE 31 07 80     DEPTH  13M
---------------------------------------------------------------------------------
     I         P          I          P          I         P          I         P
---------------------------------------------------------------------------------

 748.9        .08      740.5        .18      609.3       .13      588.2       .15
 465.4        .15      423.1        .24      410.4       .44      338.5       .27
 275.0        .51      275.0        .39      190.4       .38      169.3       .34
 154.4        .36      135.4        .52      115.9       .41       93.9       .47
  74.5        .37       63.0        .40       56.3       .44       44.4       .44
  44.0        .49       34.3        .46       30.5       .48       25.4       .45
  19.9        .43       17.3        .38       11.7       .25       11.4       .25
   7.9        .14        7.8        .18        5.7       .12        5.5       .10
   3.9        .07        2.5        .02        2.2       .05        1.9       .04
   1.7        .04        1.2        .00        1.1       .02         .9       ,03
    .8        .05


                               PARAMETER VALUES

          PS :       .54         ALPHA :      .031          BETA :    .0009

         (    .50,    .57 )      ( .028, .035 )          (  .0007,  .0011 )

  SAMPLE TEMPERATURE  0.5  C             INCUBATION TEMPERATURE  -1.0 C


  CHLOROPHYLL :      .72       RNA     :     7.11        PHOSPHATE   :      .32

  CARBON      :   111.00       DNA     :     6.21        NITRATE     :      .94

  NITROGEN    :    39.00       ATP     :     1.09        SILICATE    :     4.81

  PROTEIN     :   214.80       UREA    :      .28        AMMONIA     :      .24
```

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                              EASTERN ARCTIC 1980

LAT 75 54.00'N        LONG 68 04.00'W          DATE  1 08 80     DEPTH  10M
-----------------------------------------------------------------------------
   I          P          I          P          I          P          I          P
-----------------------------------------------------------------------------

816.7        .40      778.6        .30      719.4        .69      685.6        .37
609.4        .74      583.9        .50      554.4        .35      528.9        .55
486.6        .84      389.3        .91      385.0        .42      347.0        .56
296.2        .60      285.6        .68      213.7        .49      173.5        .58
133.3        .89      126.9        .70       97.3        .58       89.7        .65
 51.2        .64       50.4        .60       35.8        .52       34.3        .79
 25.6        .56       25.6        .48       16.7        .37       16.3        .20
 13.3        .34       12.1        .27        8.7        .31        8.6        .17
  6.7        .10        6.6        .14        4.0        .09        3.6        .05
  2.8        .07        2.5        .09        1.8        .01        1.8        .00
  1.4        .03        1.3        .03

                              PARAMETER VALUES

        PS :       .76           ALPHA :      .030            BETA :     .0005

       (   .69,  .82 )          ( .026, .035 )            (  .0003,  .0006 )

  SAMPLE TEMPERATURE  0.9  C               INCUBATION TEMPERATURE  0.3  C


  CHLOROPHYLL :      .45       RNA      :     5.67       PHOSPHATE   :      .32

  CARBON      :    84.00       DNA      :     5.94       NITRATE     :      .58

  NITROGEN    :    18.00       ATP      :     1.06       SILICATE    :     3.07

  PROTEIN     :   234.80       UREA     :      .00       AMMONIA     :      .09
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                       EASTERN ARCTIC 1980

LAT 75 54.00'N      LONG 68 04.00'W       DATE  1 08 80    DEPTH  20M
------------------------------------------------------------------------
    I         P         I         P         I         P         I         P
------------------------------------------------------------------------

748.9        .25      630.5       .23     558.5       .38     490.8       .42
452.7        .49      423.1       .35     355.4       .71     313.1       .46
283.5        .72      215.8       .58     173.5       .68     165.0       .81
165.0        .65      131.2       .53     126.9       .55     110.4       .58
 93.5        .61       78.7       .75      66.0       .68      57.1       .64
 46.5        .52       42.7       .51      33.0       .53      31.3       .57
 24.1        .52       23.7       .40      14.0       .37      13.5       .28
  9.5        .13        9.1       .27       7.0       .22       6.9       .11
  4.9        .16        4.8       .16       2.9       .06       2.8       .06
  2.0        .05        1.9       .04       1.4       .03       1.4       .03
  1.0        .01        1.0       .01

                         PARAMETER VALUES

      PS :       .80        ALPHA :      .028         BETA :     .0011

    (    .75,    .85 )     ( .025, .030 )          (  .0008,   .0013 )

 SAMPLE TEMPERATURE  0.9  C              INCUBATION TEMPERATURE  0.0  C


CHLOROPHYLL :      .68      RNA     :    6.46     PHOSPHATE   :      .32

CARBON      :    54.00      DNA     :    5.58     NITRATE     :      .16

NITROGEN    :    12.00      ATP     :    1.21     SILICATE    :     2.85

PROTEIN     :   242.00      UREA    :     .00     AMMONIA     :      .10
```

```
                        EASTERN ARCTIC 1980

  LAT 75 54.00'N       LONG 68 04.00'W        DATE  1 08 80    DEPTH  60M
 ---------------------------------------------------------------------------
     I          P          I          P          I          P          I          P
 ---------------------------------------------------------------------------

  622.0       .00      605.1       .00      499.3       .00      448.5       .00
  435.9       .00      372.4       .00      313.1       .06      262.3       .01
  211.6       .17      203.1       .19      181.9       .02      135.4       .11
  135.4       .29       92.2       .15       89.7       .33       68.1       .24
   66.0       .23       48.7       .31       45.7       .32       38.5       .33
   30.5       .27       27.1       .23       22.0       .30       20.3       .33
   12.7       .21       12.7       .15        9.1       .21        8.8       .16
    6.3       .25        6.3       .29        4.6       .10        4.6       .18
    2.8       .03        2.6       .04        1.9       .01        1.9       .00
    1.4       .00        1.3       .00        1.0       .00        1.0       .00


                          PARAMETER VALUES

        PS :        .47         ALPHA :       .027          BETA :    .0038

      (    .35,     .59 )      ( .022, .033 )            (  .0017,  .0059 )

   SAMPLE TEMPERATURE  -0.5 C               INCUBATION TEMPERATURE  -2.0 C


   CHLOROPHYLL :      .26       RNA     :   14.10       PHOSPHATE   :     .71

   CARBON      :    24.00       DNA     :    4.92       NITRATE     :    7.65

   NITROGEN    :     4.00       ATP     :     .32       SILICATE    :    5.95

   PROTEIN     :    57.30       UREA    :     .09       AMMONIA     :     .02
```

```
                               EASTERN ARCTIC 1980

LAT 75 21.50'N       LONG 69 50.30'W        DATE  3 08 80    DEPTH  16M
------------------------------------------------------------------------------
   I          P          I          P          I          P          I          P
------------------------------------------------------------------------------

816.6        .28       774.3        .24      719.3        .28      698.2        .25
639.9        .49       613.5        .45      520.5        .64      503.5        .56
473.9        .73       385.0        .73      347.0        .63      338.5        .80
292.0        .70       266.6        .72      196.8        .69      143.0        .79
138.6        .90        98.2        .67       96.5       1.00       59.2        .76
 53.3        .91        46.5        .74       38.9        .84       32.6        .54
 29.6        .61        19.0        .32       19.0        .40       12.7        .32
 12.7        .41         8.0        .21        8.0        .16        3.6        .12
  3.6        .07         2.8        .08        2.0        .09        1.9        .00
  1.4        .09         1.4        .00


                               PARAMETER VALUES

        PS :      1.09           ALPHA :      .030            BETA :     .0016

       (  1.01,   1.17 )        ( .027, .033 )             (  .0013,   .0019 )

  SAMPLE TEMPERATURE   0.9  C               INCUBATION TEMPERATURE  3.0  C


 CHLOROPHYLL :      .72        RNA      :     4.83      PHOSPHATE    :      .85

 CARBON      :    51.00        DNA      :     4.92      NITRATE      :     2.11

 NITROGEN    :    11.00        ATP      :      .90      SILICATE     :     4.81

 PROTEIN     :   148.60        UREA     :      .16      AMMONIA      :      .30
```

```
                              EASTERN ARCTIC 1980

LAT 75 21.50'N       LONG 69 50.30'W        DATE  3 08 80    DEPTH  16M
-------------------------------------------------------------------------------
   I           P          I           P          I          P          I          P
-------------------------------------------------------------------------------

803.9        .11      770.1        .03      689.7        .05      677.0        .01
559.5        .16      550.1        .08      457.0        .17      418.9        .29
414.7        .39      359.7        .36      308.9        .45      260.2        .44
258.1        .37      135.4        .42       90.1        .48       79.5        .43
 59.2        .45       49.9        .44       44.9        .51       34.7        .43
 33.0        .50       24.5        .48       22.8        .45       14.4        .34
 13.5        .43        9.6        .29        9.5        .40        6.7        .32
  6.6        .26        5.1        .18        4.9        .21        2.9        .06
  2.8        .09        2.1        .03        2.1        .07        1.5        .00
  1.4        .07        1.1        .03        1.0        .02


                              PARAMETER VALUES

        PS :       .56          ALPHA :      .048           BETA :    .0011

        (   .53,    .60 )        ( .042, .054 )           (  .0009,   .0013 )

  SAMPLE TEMPERATURE  0.9  C               INCUBATION TEMPERATURE  0.5  C


 CHLOROPHYLL :      .72        RNA      :    4.83        PHOSPHATE    :      .85

 CARBON      :    51.00        DNA      :    4.92        NITRATE      :     2.11

 NITROGEN    :    11.00        ATP      :     .90        SILICATE     :     4.81

 PROTEIN     :   148.60        UREA     :     .16        AMMONIA      :      .30
```

```
                              EASTERN ARCTIC 1980

   LAT 75 21.50'N       LONG 69 50.30'W         DATE  3 08 80    DEPTH  16M
--------------------------------------------------------------------------------
      I          P          I          P          I          P          I          P
--------------------------------------------------------------------------------

   753.2        .35      698.2        .44      600.8        .59      550.1        .87
   512.0        .83      448.5       1.00      385.0       1.02      367.3        .97
   260.2        .98      260.2       1.07      217.9       1.09      181.9       1.03
   165.0       1.02      136.2        .95      133.3        .99       98.6       1.04
    88.0        .89       66.4        .94       63.9        .97       46.1        .82
    44.4        .80       33.4        .76       33.4        .68       25.8        .62
    24.1        .64       13.1        .43       13.1        .40        9.9        .24
     9.8        .30        7.4        .18        7.0        .14        4.8        .14
     2.8        .04        2.8        .07        2.0        .06        2.0        .02
     1.5        .02        1.4        .04        1.1        .00        1.0        .00


                               PARAMETER VALUES

         PS :      1.30            ALPHA :      .031            BETA :    .0014

         ( 1.23,  1.37 )          ( .029, .033 )          (  .0011,   .0017 )


    SAMPLE TEMPERATURE  0.9  C               INCUBATION TEMPERATURE  7.0  C


   CHLOROPHYLL :      .72        RNA     :    4.83        PHOSPHATE    :      .85

   CARBON      :    51.00        DNA     :    4.92        NITRATE      :     2.11

   NITROGEN    :    11.00        ATP     :     .90        SILICATE     :     4.81

   PROTEIN     :   148.60        UREA    :     .16        AMMONIA      :      .30
```

```
                              EASTERN ARCTIC 1980

 LAT 75 21.50'N      LONG 69 50.30'W        DATE  3 08 80     DEPTH  16M
-------------------------------------------------------------------------------
    I           P          I          P          I          P         I          P
-------------------------------------------------------------------------------

 744.7        .07       732.0        .24       613.5       .16      605.1       .09
 514.2        .27       503.5        .11       448.5       .26      353.3       .20
 322.4        .30       315.2        .43       277.2       .29      224.3       .35
 223.4        .39       190.4        .33       156.6       .45      140.1       .40
  95.6        .43        69.4        .40        65.6       .44       53.3       .45
  44.0        .43        37.7        .39        33.0       .34       30.0       .42
  23.7        .41        23.3        .31        13.1       .29       11.6       .33
   9.0        .25         8.8        .23         4.4       .18        4.4       .13
   4.0        .07         3.8        .11         2.2       .07        1.9       .06
   1.9        .04         1.7        .01         1.4       .00        1.3       .01
   1.1        .01          .8        .00

                               PARAMETER VALUES

         PS :        .50           ALPHA :        .032            BETA :    .0009

       (     .47,     .53 )       ( .029, .036 )             (  .0007,    .0010 )

   SAMPLE TEMPERATURE  0.9  C                  INCUBATION TEMPERATURE  -1.5 C


  CHLOROPHYLL :       .72         RNA      :     4.83         PHOSPHATE    :     .85

  CARBON      :    51.00          DNA      :     4.92         NITRATE      :    2.11

  NITROGEN    :    11.00          ATP      :      .90         SILICATE     :    4.81

  PROTEIN     :   148.60          UREA     :      .16         AMMONIA      :     .30
```

```
                              EASTERN ARCTIC 1980

  LAT 73 52.60'N       LONG 61 47.50'W          DATE  5 08 80    DEPTH  20M
--------------------------------------------------------------------------------
     I           P          I          P          I          P          I          P
--------------------------------------------------------------------------------

  795.5         .20      702.4        .40      613.5        .35      524.7        .31
  330.0         .67      296.2        .78      262.3        .68      211.6        .85
  207.3         .80      143.9        .76      116.8        .67       80.9        .64
   69.4         .67       56.7        .58       45.3        .70       40.2        .50
   33.0         .81       25.8        .43       23.7        .39       15.2        .63
   13.5         .50       10.2        .27        9.1        .45        6.9        .48
    6.3         .46        5.0        .15        4.2        .10        2.8        .04
    2.4         .14        2.0        .04        1.8        .13        1.4        .10
    1.0         .00


                              PARAMETER VALUES

          PS :       .79          ALPHA :       .049            BETA :    .0008

         (    .72,    .86 )       ( .040, .057 )          (   .0005,   .0011 )

   SAMPLE TEMPERATURE  3.5  C              INCUBATION TEMPERATURE  0.0  C


  CHLOROPHYLL :      .66       RNA     :    8.66       PHOSPHATE   :      .76

  CARBON      :    96.00       DNA     :    4.12       NITRATE     :      .45

  NITROGEN    :    15.00       ATP     :    1.16       SILICATE    :     2.87

  PROTEIN     :   125.20       UREA    :     .42       AMMONIA     :      .05
```

```
                               EASTERN ARCTIC 1980

LAT 73 52.60'N        LONG 81 47.50'W         DATE  5 08 80    DEPTH  30M
-----------------------------------------------------------------------------
    I           P          I          P          I          P          I          P
-----------------------------------------------------------------------------

452.7         .84      380.8        .86      275.0        .98      186.2        .94
139.6         .78       79.1        .45       73.2        .69       55.4        .63
 39.8         .51       36.0        .71       31.3        .52       24.5        .43
 24.1         .57       15.2        .42       13.1        .46        9.9        .27
  9.6         .30        6.6        .23        5.9        .27        4.7        .17
  4.6         .19        2.8        .10        2.5        .12        2.2        .14
  2.0         .09        1.4        .07        1.4        .04        1.1        .15
  1.0         .04


                              PARAMETER VALUES

        PS :       .80           ALPHA :      .034            BETA :    .0000

        (   .71,    .88 )        ( .029, .039 )            ( -.0003,   .0003 )

  SAMPLE TEMPERATURE  3.0  C              INCUBATION TEMPERATURE  0.0  C


 CHLOROPHYLL :      .62       RNA     :     7.01       PHOSPHATE    :      .78

 CARBON      :    83.00       DNA     :     2.54       NITRATE      :      .54

 NITROGEN    :    23.00       ATP     :     1.31       SILICATE     :     3.06

 PROTEIN     :   114.90       UREA    :      .45       AMMONIA      :      .09
```

```
                              EASTERN ARCTIC 1980

  LAT 73 52.60'N       LONG 81 47.50'W        DATE  5 08 80    DEPTH  60M
----------------------------------------------------------------------------
      I           P          I          P          I          P          I          P
----------------------------------------------------------------------------

  723.6          .11       677.0       .03       592.4       .14       550.1       .08
  435.9          .14       427.4       .04       385.0       .12       313.1       .06
  292.0          .13       198.9       .24       196.8       .25       177.7       .31
  139.6          .36       122.7       .35        99.4       .28        86.7       .35
   77.4          .29        60.1       .24        49.9       .36        48.7       .23
   36.8          .27        32.6       .26        27.9       .31        23.7       .28
   20.7          .27        14.0       .32        12.7       .30         9.3       .18
    8.2          .24         6.8       .27         5.8       .09         4.7       .21
    4.2          .14         3.0       .02         2.6       .05         2.1       .09
    1.8          .05         1.4       .15         1.3       .10          .9       .06


                              PARAMETER VALUES

        PS .       .35          ALPHA :      .043            BETA :    .0008

       (   .32,    .37 )       ( .036, .050 )           (  .0006,   .0010 )

   SAMPLE TEMPERATURE  1.0  C               INCUBATION TEMPERATURE  -1.0 C


  CHLOROPHYLL :      .26       RNA     :     2.84      PHOSPHATE    :    1.00

  CARBON      :    45.00       DNA     :     1.10      NITRATE      :    4.63

  NITROGEN    :      -         ATP     :      .44      SILICATE     :    9.46

  PROTEIN     :    37.50       UREA    :      .27      AMMONIA      :    1.00
```

```
                              EASTERN ARCTIC 1980

 LAT 74 26.30'N       LONG 86 03.00'W          DATE  6 08 80     DEPTH   5M
--------------------------------------------------------------------------------
     I          P          I          P          I          P          I          P
--------------------------------------------------------------------------------

 799.7        .45     761.6        .29     689.7        .42     677.0        .32
 634.7        .78     600.8        .48     507.8        .67     427.4        .80
 406.2        .60     397.7        .59     338.5        .66     321.6        .88
 298.3        .68     245.4        .75     243.3        .66     158.7        .72
 146.0        .70     101.6        .87      76.2        .78      74.0        .87
  52.9        .84      38.1        .82      37.2        .71      25.8        .67
  15.2        .50      14.0        .63      11.6        .47      11.0        .55
   7.8        .35       7.3        .36       6.3        .19       5.6        .21
   3.2        .11       2.5        .13       2.4        .08       1.5        .03
   1.4        .07       1.3        .07       1.2        .05


                              PARAMETER VALUES

         PS :       .90          ALPHA :     .056           BETA :    .0008

        (   .86,   .95 )        ( .050, .062 )          (  .0006,  .0010 )

   SAMPLE TEMPERATURE  2.2  C              INCUBATION TEMPERATURE  0.0  C


  CHLOROPHYLL :     2.43        RNA      :     9.30       PHOSPHATE   :      .81

  CARBON      :   205.00        DNA      :     2.09       NITRATE     :      .07

  NITROGEN    :    20.00        ATP      :      .71       SILICATE    :     3.22

  PROTEIN     :    77.00        UREA     :      .07       AMMONIA     :      .05
```

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                              EASTERN ARCTIC 1980

LAT 74 26.30'N       LONG 86 03.00'W         DATE  6 08 80    DEPTH  24M
--------------------------------------------------------------------------------
     I            P         I          P         I          P         I          P
--------------------------------------------------------------------------------

719.3          .11     681.2        .06     613.5         .08     575.5         .12
507.8          .14     457.0        .08     380.8         .14     338.5         .24
313.1          .18     308.9        .29     262.3         .18     253.9         .23
205.2          .20     173.5        .41     169.3         .30     139.6         .33
112.1          .48      91.0        .32      82.5         .42      62.6         .56
 59.2          .65      44.0        .54      43.2         .36      31.3         .49
 30.5          .53      21.6        .44      21.2         .27      13.5         .22
 12.7          .28       8.7        .24       8.7         .24       6.1         .13
  5.9          .10       4.3        .08       4.1         .05       2.5         .03
  2.5          .03       1.9        .03       1.9         .03       1.4         .00
  1.3          .02       1.0        .02       1.0         .01

                              PARAMETER VALUES

        PS :        .67          ALPHA :       .029         BETA :     .0026

       (    .60,    .73 )       ( .026, .032 )          (   .0020,   .0031 )

  SAMPLE TEMPERATURE  -0.5 C               INCUBATION TEMPERATURE  -0.5 C


 CHLOROPHYLL :    9.51        RNA     :   22.06        PHOSPHATE    :     1.13

 CARBON      :  155.00        DNA     :    4.02        NITRATE      :     1.41

 NITROGEN    :   40.00        ATP     :    1.47        SILICATE     :    10.62

 PROTEIN     :  431.20        UREA    :     .00        AMMONIA      :      .09
```

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                              EASTERN ARCTIC 1980

   LAT 74 26.30'N       LONG 86 03.00'W         DATE  6 08 80     DEPTH  60M
-------------------------------------------------------------------------------
      I           P           I           P           I           P           I           P
-------------------------------------------------------------------------------

   677.0        .11      677.0         .06     592.4         .04     558.5         .04
   444.3        .16      435.8         .05     408.3         .07     355.4         .06
   319.5        .25      283.5         .13     209.4         .21     205.2         .24
   184.1        .11      139.6         .22     135.4         .15      99.9         .20
    93.1        .21       72.8         .23      67.7         .21      55.9         .27
    42.3        .21       40.6         .18      30.9         .18      28.4         .19
    22.4        .24       20.7         .22      13.1         .20      11.8         .19
     7.8        .15        6.2         .30       6.2         .28       4.1         .12
     2.5        .06        1.9         .05       1.2         .02       1.0         .05
      .9        .00


                              PARAMETER VALUES

         PS :       .24           ALPHA :      .056           BETA :    .0004

        (    .22,    .26 )       ( .042, .071 )            (  .0003,   .0006 )

    SAMPLE TEMPERATURE  -1.0 C                 INCUBATION TEMPERATURE  -2.0 C


    CHLOROPHYLL :      .68        RNA      :     2.52        PHOSPHATE    :     1.55

    CARBON      :    25.00        DNA      :      .44        NITRATE      :    11.38

    NITROGEN    :     7.00        ATP      :       -         SILICATE     :    22.89

    PROTEIN     :    42.30        UREA     :      .00        AMMONIA      :      .00
```

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                                  EASTERN ARCTIC 1980

 LAT 73 48.30'N        LONG 81 05.50'W        DATE 12 08 80     DEPTH  40M
-------------------------------------------------------------------------------
    I          P          I          P          I          P          I          P
-------------------------------------------------------------------------------

 782.8        .15     729.9        .16     666.4        .19     613.5        .13
 592.4        .44     560.6        .23     454.9        .38     444.3        .69
 435.8        .45     351.2        .55     321.6        .51     304.7        .80
 287.7        .68     230.6        .75     196.8        .91     139.6        .82
 107.9        .91      88.9       1.02      80.4        .87      67.7        .75
  52.9        .80      48.7        .86      37.7        .90      33.0        .75
  28.4        .73      25.8        .78      17.8        .50      12.3        .41
  11.8        .41       8.9        .29       8.5        .35       6.1        .22
   5.7        .19       3.5        .10       3.5        .14       2.7        .12
   2.5        .10       1.8        .05       1.7        .04       1.4        .05
   1.3        .06


                                  PARAMETER VALUES

         PS :      1.22           ALPHA :      .041           BETA :    .0028

        (  1.14,   1.30 )        ( .037, .044 )           (  .0023,   .0032 )

   SAMPLE TEMPERATURE  0.7  C              INCUBATION TEMPERATURE  4.5  C


  CHLOROPHYLL :    4.72        RNA     :     9.92       PHOSPHATE    :    1.31

  CARBON      :  268.00        DNA     :     1.76       NITRATE      :    1.99

  NITROGEN    :   26.00        ATP     :     2.82       SILICATE     :    6.33

  PROTEIN     :  221.40        UREA    :      .61       AMMONIA      :     .43
```

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                              EASTERN ARCTIC 1980

 LAT 73 48.30'N       LONG 81 05.50'W        DATE 12 08 80    DEPTH  40M
--------------------------------------------------------------------------------
    I           P         I          P         I          P         I          P
--------------------------------------------------------------------------------

 761.6        .18       740.5       .16      655.9       .19      643.2       .23
 583.9        .45       550.1       .46      539.5       .29      465.4       .50
 418.9        .68       402.0       .65      355.4       .71      308.9       .81
 266.6        .85       249.6       .95      196.8       .93      186.2      1.04
 152.3        .91       105.8       .97       86.7      1.05       72.8       .93
  60.1        .91        47.4       .90       45.3       .96       35.5       .94
  35.1        .87        22.8       .84       22.4       .85       14.0       .67
  13.1        .68        10.4       .50       10.4       .46        7.2       .34
   7.0        .39         4.7       .24        3.1       .19        2.8       .18
   2.2        .14         2.1       .12        1.5       .09        1.4       .10
   1.0        .09         1.0       .06


                               PARAMETER VALUES

            PS :      1.25          ALPHA :      .060           BETA :    .0024

          ( 1.19,  1.31 )         ( .056, .065 )          (  .0021,  .0027 )

   SAMPLE TEMPERATURE  0.7  C              INCUBATION TEMPERATURE  6.0  C


  CHLOROPHYLL :    4.72        RNA      :     9.92        PHOSPHATE   :    1.31

  CARBON      :  268.00        DNA      :     1.76        NITRATE     :    1.99

  NITROGEN    :   26.00        ATP      :     2.82        SILICATE    :    6.33

  PROTEIN     :  221.40        UREA     :      .61        AMMONIA     :     .43
```

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                                EASTERN ARCTIC 1980

LAT 73 48.30'N      LONG 81 05.50'W          DATE 12 08 80    DEPTH  40M
------------------------------------------------------------------------------------
    I         P         I         P         I         P         I         P
------------------------------------------------------------------------------------

 643.2       .06     638.9       .05     571.2       .07     528.9       .09
 528.9       .14     423.1       .15     402.0       .18     336.4       .26
 287.7       .21     260.2       .33     207.3       .36     203.1       .44
 173.5       .53     143.9       .55     141.7       .53     112.1       .57
  91.0       .58      71.9       .55      65.6       .60      50.8       .56
  41.0       .61      39.4       .62      30.9       .56      25.0       .63
  22.0       .49      19.5       .50      15.7       .31      11.0       .41
   9.5       .34       7.4       .32       7.4       .28       4.9       .20
   4.8       .21       3.6       .14       3.4       .15       1.9       .08
   1.9       .09       1.5       .06       1.1       .03       1.0       .04
    .8       .03        .7       .02

                                PARAMETER VALUES

        PS :       .81          ALPHA :      .044           BETA :     .0029

       (   .77,    .85 )        ( .041, .046 )           (  .0026,   .0032 )

  SAMPLE TEMPERATURE  0.7  C              INCUBATION TEMPERATURE  1.0  C


 CHLOROPHYLL :    4.72       RNA     :     9.92       PHOSPHATE    :    1.31

 CARBON      :  268.00       DNA     :     1.76       NITRATE      :    1.99

 NITROGEN    :   26.00       ATP     :     2.82       SILICATE     :    6.33

 PROTEIN     :  221.40       UREA    :      .61       AMMONIA      :     .43
```

```
                                EASTERN ARCTIC 1980

  LAT 73 48.30'N        LONG 81 05.50'W          DATE 12 08 80     DEPTH  40M
-----------------------------------------------------------------------------------
      I          P          I          P          I          P          I          P
-----------------------------------------------------------------------------------

  660.1        .05      655.9        .10      592.4        .06      558.5        .04
  435.8        .18      412.6        .06      406.2        .13      334.3        .15
  275.0        .27      245.4        .27      181.9        .37      165.0        .39
  160.8        .38      118.5        .43      104.9        .52       84.6        .46
   67.7        .50       55.0        .46       44.4        .41       39.4        .60
   33.4        .52       30.9        .57       25.0        .50       22.0        .56
   16.9        .26       15.7        .46        9.1        .19        8.3        .29
    5.3        .16        5.1        .21        3.6        .09        3.5        .13
    2.6        .04        2.4        .08        1.5        .02        1.3        .02
    1.0        .02         .7        .00         .7        .00         .5        .01


                                 PARAMETER VALUES

        PS :       .69           ALPHA :      .039            BETA :     .0027

       (    .64,    .74 )       ( .035, .043 )            (  .0022,   .0031 )

   SAMPLE TEMPERATURE  0.7  C                INCUBATION TEMPERATURE  -0.5 C


  CHLOROPHYLL :     4.72        RNA      :     9.92        PHOSPHATE    :     1.31

  CARBON      :   268.00        DNA      :     1.76        NITRATE      :     1.99

  NITROGEN    :    26.00        ATP      :     2.82        SILICATE     :     6.33

  PROTEIN     :   221.40        UREA     :      .61        AMMONIA      :      .43
```

```
                              EASTERN ARCTIC 1980

LAT 74 37.90'N      LONG 93 39.00'W        DATE 13 08 80    DEPTH   5M
---------------------------------------------------------------------------------
     I           P           I           P           I          P          I          P
---------------------------------------------------------------------------------

833.6         .34       782.8        .15       727.8        .29      677.0        .25
617.8         .60       600.8        .29       583.9        .49      486.6        .73
486.6         .53       446.3        .67       359.7        .82      334.3        .65
292.0         .72       228.5        .83       224.3        .76      177.7        .76
139.6         .85       126.5        .79        98.2        .90       82.5        .78
 66.4         .82        58.4        .82        50.4        .85       38.5        .78
 37.7         .79        28.4        .70        27.9        .76       19.5        .72
 18.6         .62        13.1        .58        12.7        .60        8.9        .37
  5.8         .31  [illegible].6     .35         3.4        .20        3.3        .20
  2.5         .12         2.4        .12         1.7        .08        1.6        .07
  1.3         .05         1.2        .05

                                PARAMETER VALUES

          PS :      .97           ALPHA :      .060            BETA :     .0012

         (   .93,  1.01 )         ( .055, .066 )            (  .0010,   .0014 )

  SAMPLE TEMPERATURE  0.0  C                 INCUBATION TEMPERATURE  -1.0 C


  CHLOROPHYLL :     8.13       RNA      :   12.36       PHOSPHATE   :      .80

  CARBON      :   174.00       DNA      :    1.35       NITRATE     :      .00

  NITROGEN    :    10.00       ATP      :    3.31       SILICATE    :     2.70

  PROTEIN     :   352.60       UREA     :     .37       AMMONIA     :      .28
```

```
                            EASTERN ARCTIC 1980

LAT 74 37.90'N      LONG 93 39.00'W          DATE 13 08 80    DEPTH  10M
--------------------------------------------------------------------------
    I          P         I          P         I          P         I          P
--------------------------------------------------------------------------

 744.7        .34      677.0       .44      613.5       .33      533.1       .46
 465.4        .60      427.4       .50      380.8       .71      321.6       .63
 300.4        .81      262.3       .79      228.5       .73      207.3       .77
 156.6        .68      148.1       .72      139.6       .78      117.6       .92
 101.6        .73       66.0       .78       55.9       .89       42.7       .74
  39.8        .81       30.0       .80       29.6       .88       21.2       .62
  20.7        .63       12.2       .46       11.9       .60        9.6       .34
   8.9        .31        6.4       .24        6.0       .22        4.1       .18
   4.0        .20        2.5       .10        2.4       .10        1.7       .04
   1.7        .05        1.2       .05        1.1       .02         .9       .01
    .8        .02


                              PARAMETER VALUES

        PS :       .95          ALPHA :      .053          BETA :    .0012

       (   .91,    .99 )       ( .049,  .057 )          (  .0010,   .0013 )

    SAMPLE TEMPERATURE  0.0  C            INCUBATION TEMPERATURE  -0.5 C


   CHLOROPHYLL :    8.92       RNA     :   14.42      PHOSPHATE   :      .86

   CARBON      :     -         DNA     :    3.44      NITRATE     :      .00

   NITROGEN    :     -         ATP     :    4.67      SILICATE    :     2.07

   PROTEIN     :  699.90       UREA    :     .47      AMMONIA     :      .07
```

```
                            EASTERN ARCTIC 1980

LAT 74 37.90'N       LONG 93 39.00'W          DATE 13 08 80     DEPTH  25M
------------------------------------------------------------------------------
   I            P         I            P         I            P         I            P
------------------------------------------------------------------------------

685.5         .18     681.2          .35     575.5          .25     528.9          .27
448.5         .46     418.9          .51     406.2          .67     317.3          .62
258.1         .83     249.6          .93     245.4          .70     196.8          .84
194.6         .94     169.3          .89     150.2          .83     103.7          .86
 84.6         .75      74.0          .84      55.9          .93      53.7          .82
 40.6         .75      30.9          .88      27.9          .71      20.3          .60
 19.0         .82      10.4          .53       9.9          .43       6.6          .29
  6.5         .33       4.7          .21       4.3          .21       3.2          .15
  3.1         .16       1.7          .06       1.7          .07       1.3          .04
  1.3         .04        .9          .02        .8          .03        .7          .02
   .6         .02


                              PARAMETER VALUES

      PS :      1.09            ALPHA :       .054            BETA :     .0019

     (  1.03,  1.15 )          ( .049, .059 )           (  .0016,   .0022 )

  SAMPLE TEMPERATURE  -0.8 C              INCUBATION TEMPERATURE  -0.5 C


 CHLOROPHYLL :   15.02        RNA     :   20.00       PHOSPHATE    :    1.18

 CARBON      :  146.00        DNA     :    3.28       NITRATE      :    2.19

 NITROGEN    :   29.00        ATP     :    5.45       SILICATE     :    9.08

 PROTEIN     :  569.60        UREA    :     .89       AMMONIA      :     .47
```

EASTERN ARCTIC 1980

LAT 74 28.70'N LONG 92 02.30'W DATE 14 08 80 DEPTH 29M

I	P	I	P	I	P	I	P
842.0	.01	787.0	.01	719.3	.01	708.7	.01
592.4	.02	571.2	.05	550.1	.03	524.7	.03
473.9	.09	448.5	.08	397.7	.08	334.3	.14
321.6	.14	304.7	.15	258.1	.22	198.9	.24
156.6	.29	148.1	.31	122.7	.29	101.6	.27
76.2	.29	71.9	.30	54.2	.29	44.4	.29
36.4	.34	30.9	.31	27.1	.33	19.9	.29
16.9	.27	14.4	.25	12.7	.23	10.2	.18
9.8	.16	7.5	.12	7.2	.12	4.9	.06
4.5	.06	3.0	.04	2.8	.05	2.1	.01
2.1	.02	1.6	.03	1.5	.02		

PARAMETER VALUES

PS :	.43	ALPHA :	.023	BETA :	.0016
	(.41, .46)		(.021, .024)		(.0014, .0018)

SAMPLE TEMPERATURE -1.0 C INCUBATION TEMPERATURE -3.0 C

CHLOROPHYLL :	3.43	RNA :	7.14	PHOSPHATE :	.91
CARBON :	80.00	DNA :	1.60	NITRATE :	5.34
NITROGEN :	14.00	ATP :	1.48	SILICATE :	14.27
PROTEIN :	259.30	UREA :	.61	AMMONIA :	.26

```
                              EASTERN ARCTIC 1980

 LAT 74 28.70'N        LONG 92 02.30'W          DATE 14 08 80     DEPTH  29M
--------------------------------------------------------------------------------
    I           P          I          P          I          P          I          P
--------------------------------------------------------------------------------

 825.1        .04       803.9        .02       719.3        .09       708.7        .06
 613.5        .14       592.4        .07       592.4        .18       454.9        .19
 444.3        .44       431.6        .32       338.5        .34       306.8        .64
 243.3        .60       239.1        .65       194.6        .77       160.8        .74
 137.5        .74       107.9        .80        89.7        .82        80.4        .86
  64.7        .77        54.2        .88        45.3        .81        41.5        .89
  34.3        .83        28.8        .83        26.2        .76        18.6        .65
  16.1        .65        12.1        .45        11.6        .48         8.5        .37
   8.5        .27         6.6        .24         5.7        .19         3.6        .10
   3.3        .14         2.7        .07         2.7        .03         1.9        .04
   1.8        .08         1.3        .01         1.2        .02

                              PARAMETER VALUES

         PS :      1.18           ALPHA :      .049            BETA :     .0037

       ( 1.12,   1.24 )          ( .046, .053 )             (  .0032,   .0041 )

  SAMPLE TEMPERATURE   -1.0 C             INCUBATION TEMPERATURE   5.0  C


  CHLOROPHYLL :     3.43       RNA     :     7.14       PHOSPHATE   :      .91

  CARBON      :    80.00       DNA     :     1.60       NITRATE     :     5.34

  NITROGEN    :    14.00       ATP     :     1.48       SILICATE    :    14.27

  PROTEIN     :   259.30       UREA    :      .61       AMMONIA     :      .26
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                              EASTERN ARCTIC 1980

 LAT 74 29.70'N      LONG 92 02.30'W        DATE 14 03 80    DEPTH  29M
------------------------------------------------------------------------------
    I          P          I          P          I          P          I          P
------------------------------------------------------------------------------

 710.9        .03     660.1        .03     617.8        .04     560.6        .05
 528.9        .11     444.3        .06     368.1        .12     330.0        .12
 308.9        .25     270.8        .22     224.3        .29     207.3        .22
 167.1        .49     162.9        .44     160.8        .57     117.2        .60
 110.0        .65      82.5        .65      71.9        .76      60.9        .66
  51.6        .70      39.8        .68      36.8        .70      25.8        .62
  25.8        .38      19.0        .28      18.2        .29      11.8        .14
  11.6        .21       8.7        .13       7.7        .64       5.0        .68
   4.9        .66       3.7        .50       3.3        .50       2.5        .34
   2.1        .11       1.9        .06       1.6        .08       1.3        .04
   1.1        .04        .9        .04        .8        .04

                              PARAMETER VALUES

        PS :      .97          ALPHA :      .046          BETA :     .0048

       (   .76,   1.19 )       ( .036, .056 )          (  .0024,   .0072 )

  SAMPLE TEMPERATURE  -1.0 C                INCUBATION TEMPERATURE  0.0  C


  CHLOROPHYLL :    3.43        RNA      :    7.14        PHOSPHATE   :     .91

  CARBON      :   80.00        DNA      :    1.60        NITRATE     :    5.34

  NITROGEN    :   14.00        ATP      :    1.48        SILICATE    :   14.27

  PROTEIN     :  259.30        UREA     :     .61        AMMONIA     :     .26
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                                    EASTERN ARCTIC 1980

  LAT 74 28.70'N        LONG 92 02.30'W          DATE 14 08 80     DEPTH  29M
 -----------------------------------------------------------------------------
     I           P            I          P          I           P          I          P
 -----------------------------------------------------------------------------

  782.8         .03       719.3        .02      626.2         .02      567.0        .03
  461.2         .03       423.1        .08      423.1         .05      342.7        .06
  300.4         .13       287.7        .14      266.6         .13      201.0        .27
  187.9         .28       173.5        .23      133.3         .38      120.6        .38
   97.3         .46        86.7        .51       69.8         .49       62.2        .50
   51.6         .55        40.2        .53       36.4         .52       25.8        .49
   22.8         .55        19.0        .50       16.9         .57       11.8        .44
   10.2         .42         8.0        .34        7.2         .33        5.7        .24
    5.1         .28         3.9        .20        3.6         .18        2.1        .09
    2.0         .08         1.3        .06        1.3         .04        1.0        .03
     .9         .05          .7        .07         .6         .01

                                    PARAMETER VALUES

          PS :        .73            ALPHA :      .060            BETA :      .0041

          (    .70,    .75 )          ( .058, .063 )            (  .0037,   .0044 )

    SAMPLE TEMPERATURE  -1.0 C                   INCUBATION TEMPERATURE  2.0  C


   CHLOROPHYLL :     3.43          RNA      :     7.14        PHOSPHATE    :       .91

   CARBON      :    80.00          DNA      :     1.60        NITRATE      :      5.34

   NITROGEN    :    14.00          ATP      :     1.48        SILICATE     :     14.27

   PROTEIN     :   259.30          UREA     :      .61        AMMONIA      :       .26
```

```
                              EASTERN ARCTIC 1980

 LAT 73 37.60'N        LONG 89 44.00'W         DATE 15 08 80     DEPTH  10M
------------------------------------------------------------------------------
    I          P         I          P          I          P         I          P
------------------------------------------------------------------------------

 842.0        .29     837.8        .28      719.3        .31     719.3        .45
 634.7        .52     613.5        .68      499.3        .77     486.6        .73
 482.4        .73     402.0        .75      283.5        .79     275.0        .86
 245.4        .81     196.8        .87      186.2        .87      97.7        .75
  91.0        .73      70.7        .71       63.5        .67      48.7        .86
  45.3        .70      35.5        .67       30.5        .73      25.8        .73
  16.9        .47      16.9        .44       12.7        .38      11.2        .74
   9.3        .16       8.0        .22        6.3        .17       5.4        .00
   3.4        .00       2.2        .01        1.6        .01       1.2        .00
   1.1        .00


                              PARAMETER VALUES

        PS :      .98          ALPHA :    .037          BETA :    .0009

      (   .90,   1.06 )       ( .032, .042 )        (  .0007,  .0012 )

  SAMPLE TEMPERATURE  2.0  C              INCUBATION TEMPERATURE  2.5  C


 CHLOROPHYLL :      .62      RNA     :     5.04      PHOSPHATE    :      .57

 CARBON      :    73.00      DNA     :     1.62      NITRATE      :      .00

 NITROGEN    :    14.00      ATP     :     1.15      SILICATE     :     4.59

 PROTEIN     :    99.00      UREA    :      .61      AMMONIA      :      .26
```

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                                EASTERN ARCTIC 1980

 LAT 73 37.60'N       LONG 89 44.00'W        DATE 15 08 80     DEPTH  20M
-----------------------------------------------------------------------------
    I            P           I            P           I            P           I            P
-----------------------------------------------------------------------------

 702.4          .03        651.6         .02        609.3         .03        562.9         .04
 490.9          .07        461.2         .05        431.6         .07        347.0         .07
 334.3          .18        281.4         .27        230.6         .18        224.3         .31
 162.9          .31        160.8         .27        139.6         .48        113.4         .44
 101.6          .54         71.1         .41         68.5         .42         48.2         .43
  48.2          .45         39.4         .43         36.4         .61         29.2         .47
  25.9          .60         19.9         .54         18.6         .53         10.6         .35
  10.3          .32          8.0         .25          8.0         .31          5.2         .15
   5.1          .19          3.9         .12          3.6         .16          2.3         .06
   2.2          .06          1.6         .05          1.6         .04          1.2         .01
   1.2          .03           .9         .01           .9         .04

                               PARAMETER VALUES

        PS :       .66             ALPHA :       .048             BETA :     .0029

        (    .61,    .70 )          ( .044, .053 )                (  .0024,   .0034 )

  SAMPLE TEMPERATURE  0.0  C                  INCUBATION TEMPERATURE  0.0  C


 CHLOROPHYLL :     3.22        RNA     :   11.03       PHOSPHATE    :     .72

 CARBON      :    93.00        DNA     :    1.96       NITRATE      :     .83

 NITROGEN    :    15.00        ATP     :    1.50       SILICATE     :    7.78

 PROTEIN     :   214.80        UREA    :     .45       AMMONIA      :     .25
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                              EASTERN ARCTIC 1980

LAT 73 37.60'N        LONG 89 44.00'W          DATE 15 08 80     DEPTH  40M
-----------------------------------------------------------------------------
    I           P          I          P          I          P          I          P
-----------------------------------------------------------------------------

753.2         .05      698.2        .04     596.6        .03     558.5        .02
461.2         .03      431.6        .07     414.7        .08     270.8        .17
266.6         .15      266.6        .14     186.2        .20     181.9        .24
175.6         .28      137.5        .32     118.5        .29      93.9        .38
 69.8         .47       67.3        .37      51.2        .38      50.8        .50
 35.5         .37       35.1        .35      28.4        .52      25.4        .42
 19.0         .39       11.4        .31       9.7        .29       7.4        .27
  7.1         .21        4.9        .17       4.7        .17       3.3        .15
  3.2         .11        1.7        .09       1.4        .07       1.3        .04
  1.0         .04         .9        .04        .7        .03        .6        .02


                              PARAMETER VALUES

       PS :        .55            ALPHA :       .044            BETA :     .0026

      (    .52,    .58 )          ( .041, .048 )            (  .0022,   .0029 )

  SAMPLE TEMPERATURE  -1.2 C                 INCUBATION TEMPERATURE  -0.5 C


 CHLOROPHYLL :     2.39       RNA      :      5.12      PHOSPHATE    :     1.22

 CARBON      :    58.00       DNA      :       .76      NITRATE      :     7.00

 NITROGEN    :    12.00       ATP      :       .85      SILICATE     :    18.10

 PROTEIN     :   160.60       UREA     :       .25      AMMONIA      :      .48
```

EASTERN ARCTIC 1980

LAT 73 05.00'N LONG 84 32.30'W DATE 18 08 80 DEPTH 5M

I	P	I	P	I	P	I	P
846.3	.50	719.3	.35	698.2	.59	634.7	.58
571.2	.86	507.8	.87	486.6	.98	465.4	1.01
410.4	.91	355.4	1.09	330.0	1.14	232.7	.91
215.8	1.03	211.6	.89	156.6	1.03	135.4	1.01
112.1	1.09	93.1	1.03	78.3	1.07	67.7	1.08
50.8	1.08	46.5	1.07	36.0	1.01	33.0	.94
27.9	.87	22.0	.61	19.0	.59	13.5	.40
11.4	.34	9.8	.28	8.9	.27	7.0	.20
5.9	.27	3.9	.04	3.6	.02	3.0	.00
2.7	.08	2.0	.00	1.9	.00		

PARAMETER VALUES

PS : 1.29	ALPHA : .043	BETA : .0012
(1.21, 1.36)	(.039, .047)	(.0010, .0015)

SAMPLE TEMPERATURE 3.2 C INCUBATION TEMPERATURE 4.0 C

CHLOROPHYLL :	.62	RNA :	4.52	PHOSPHATE :	.53
CARBON :	82.00	DNA :	.88	NITRATE :	.00
NITROGEN :	13.00	ATP :	1.01	SILICATE :	3.11
PROTEIN :	89.60	UREA :	.36	AMMONIA :	.20

EASTERN ARCTIC 1980

LAT 73 05.00'N   LONG 84 32.30'W   DATE 18 08 80   DEPTH 5M

I	P	I	P	I	P	I	P
846.3	.93	825.1	.81	761.6	1.31	744.7	1.06
681.2	1.43	630.5	1.42	575.5	1.54	528.9	1.23
465.4	1.61	423.1	1.51	338.5	1.39	330.0	1.54
258.1	1.51	249.6	1.64	241.2	1.42	152.3	1.63
131.2	1.60	97.3	1.37	85.5	1.42	76.2	1.50
59.2	1.35	55.9	1.27	42.3	1.15	38.9	1.13
30.5	1.19	28.4	.97	16.9	.70	16.9	.63
13.1	.42	12.1	.36	9.2	.36	9.1	.27
6.8	.22	6.3	.41	3.5	.22	3.5	.20
2.5	.13	2.3	.13	1.7	.22	1.6	.13

PARAMETER VALUES

PS : 1.77   ALPHA : .047   BETA : .0009

(1.69, 1.86)   (.043, .050)   (.0007, .0012)

SAMPLE TEMPERATURE 3.2 C   INCUBATION TEMPERATURE 7.5 C

CHLOROPHYLL : .62   RNA : 4.52   PHOSPHATE : .53

CARBON : 82.00   DNA : .88   NITRATE : .00

NITROGEN : 13.00   ATP : 1.01   SILICATE : 3.11

PROTEIN : 89.60   UREA : .36   AMMONIA : .20

EASTERN ARCTIC 1980

LAT 73 05.00'N LONG 84 32.30'W DATE 18 05 80 DEPTH 5M

I	P	I	P	I	P	I	P
812.4	.37	748.9	.27	668.5	.33	609.3	.47
461.2	.51	435.8	.79	368.1	.89	347.0	.73
296.2	.87	186.2	.84	146.0	.78	124.8	.73
93.1	.72	79.5	.83	78.3	.79	56.7	.68
52.9	.85	41.5	.68	38.5	.62	27.1	.74
26.7	.46	20.3	.60	18.2	.34	11.4	.50
11.2	.35	8.0	.24	7.8	.09	5.7	.15
5.5	.06	3.7	.10	2.3	.09	2.2	.06
1.5	.03	1.5	.02	1.1	.14	1.0	.10
.8		.8	.09				

PARAMETER VALUES

PS :	.99	ALPHA :	.033	BETA :	.0011
(.91, 1.06)		(.029, .036)		(.0008, .0014)	

SAMPLE TEMPERATURE 3.2 C INCUBATION TEMPERATURE 1.5 C

CHLOROPHYLL :	.62	RNA :	4.52	PHOSPHATE :	.53
CARBON :	82.00	DNA :	.88	NITRATE :	.00
NITROGEN :	13.00	ATP :	1.01	SILICATE :	3.11
PROTEIN :	89.60	UREA :	.36	AMMONIA :	.20

EASTERN ARCTIC 1980

LAT 73 05.00'N LONG 84 32.30'W DATE 18 08 80 DEPTH 5M

I	P	I	P	I	P	I	P
808.2	.20	740.5	.15	634.7	.15	613.5	.21
465.4	.44	317.3	.53	287.7	.53	251.8	.53
215.8	.57	198.9	.58	173.5	.59	148.1	.64
99.4	.55	76.2	.56	71.9	.61	50.8	.63
46.5	.56	37.2	.57	32.6	.66	26.2	.52
22.8	.57	18.6	.52	16.1	.49	8.9	.29
8.5	.31	5.3	.16	3.2	.14	3.2	.13
2.3	.04	2.2	.07	1.2	.06	1.2	.03
.8	.07	.8	.03	.6	.04	.6	.01
.4	.00	.4	.01				

PARAMETER VALUES

PS : .73	ALPHA : .044	BETA : .0012
(.70, .76)	(.041, .048)	(.0010, .0013)

SAMPLE TEMPERATURE 3.2 C

INCUBATION TEMPERATURE -1.5 C

CHLOROPHYLL :	.62	RNA :	4.52	PHOSPHATE :	.53
CARBON :	82.00	DNA :	.88	NITRATE :	.00
NITROGEN :	13.00	ATP :	1.01	SILICATE :	3.11
PROTEIN :	89.60	UREA :	.36	AMMONIA :	.20

EASTERN ARCTIC 1980

LAT 74 12.80'N LONG 81 46.00'W DATE 19 08 80 DEPTH 11M

I	P	I	P	I	P	I	P
863.2	.21	829.3	.18	748.9	.21	715.1	.26
634.7	.34	600.8	.57	500.8	.39	486.6	.47
457.0	.61	423.1	.67	404.1	.60	342.7	.82
340.6	.77	289.8	.59	251.8	.77	222.1	.71
158.7	.74	135.4	.84	116.4	.66	98.2	.62
92.2	.78	64.7	.78	58.4	.80	48.2	.71
43.2	.59	33.0	.84	29.2	.87	23.7	.27
23.3	.25	14.0	.10	13.5	.15	9.5	.05
9.0	.02	7.0	.58	6.9	.62	5.0	.48
4.9	.47	3.0	.31	2.8	.25	2.1	.00
2.1	.03	1.6	.02	1.4	.00		

PARAMETER VALUES

PS : .96	ALPHA : .032	BETA : .0013
(.84, 1.09)	(.025, .038)	(.0008, .0018)

SAMPLE TEMPERATURE 2.5 C

INCUBATION TEMPERATURE 4.0 C

CHLOROPHYLL :	2.36	RNA :	9.14	PHOSPHATE :	.80
CARBON :	308.00	DNA :	3.63	NITRATE :	.00
NITROGEN :	-	ATP :	1.58	SILICATE :	1.42
PROTEIN :	243.00	UREA :	.10	AMMONIA :	.55

EASTERN ARCTIC 1980

LAT 74 12.80'N LONG 81 46.00'W DATE 19 08 80 DEPTH 11M

I	P	I	P	I	P	I	P
863.2	.19	740.5	.12	719.3	.03	630.5	.05
613.5	.02	613.5	.13	478.1	.18	448.5	.14
431.6	.29	423.1	.27	332.2	.33	327.9	.29
247.5	.27	228.5	.38	198.9	.42	155.7	.41
126.9	.45	91.0	.41	54.2	.42	49.9	.47
38.9	.45	35.5	.43	27.5	.49	27.1	.47
17.3	.37	16.9	.38	12.5	.43	12.1	.48
9.9	.30	8.9	.26	6.6	.14	6.4	.45
3.9	.05	3.8	.10	2.9	.10	2.6	.09
2.0	.01	1.3	.03	1.3	.03		

PARAMETER VALUES

PS :	.54	ALPHA :	.049	BETA :	.0012
(.50,	.58)	(.042,	.055)	(.0009,	.0014)

SAMPLE TEMPERATURE 2.5 C INCUBATION TEMPERATURE 0.0 C

CHLOROPHYLL :	2.36	RNA :	9.14	PHOSPHATE :	.80
CARBON :	308.00	DNA :	3.63	NITRATE :	.00
NITROGEN :	-	ATP :	1.58	SILICATE :	1.42
PROTEIN :	243.00	UREA :	.10	AMMONIA :	.55

EASTERN ARCTIC 1980

LAT 74 12.80'N LONG 81 46.00'W DATE 19 08 80 DEPTH 11M

I	P	I	P	I	P	I	P
820.9	.16	774.3	.16	668.5	.13	600.8	.29
575.5	.39	486.6	.46	478.1	.29	336.4	.46
334.3	.59	330.9	.55	246.3	.77	236.1	.70
188.3	.77	158.7	.74	156.6	.75	134.6	.70
119.3	.77	93.1	.68	79.5	.71	65.2	.74
58.0	.80	44.9	.72	43.6	.84	30.5	.70
30.0	.65	21.6	.74	20.7	.76	12.4	.51
11.8	.51	8.9	.38	8.9	.33	6.1	.22
5.4	.30	4.1	.17	3.8	.18	2.6	.08
2.5	.09	1.6	.06	1.6	.06	1.2	.04
1.1	.02	.8	.08	.8	.01		

PARAMETER VALUES

PS :	.94	ALPHA :	.055	BETA :	.0017
	(.90, .98)		(.051, .060)		(.0015, .0019)

SAMPLE TEMPERATURE 2.5 C INCUBATION TEMPERATURE 1.5 C

CHLOROPHYLL :	2.36	RNA :	9.14	PHOSPHATE :	.80
CARBON :	308.00	DNA :	3.63	NITRATE :	.00
NITROGEN :	-	ATP :	1.58	SILICATE :	1.42
PROTEIN :	243.00	UREA :	.10	AMMONIA :	.55

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                                EASTERN ARCTIC 1980

LAT 74 12.80'N        LONG 81 46.00'W          DATE 19 08 80      DEPTH  11M
---------------------------------------------------------------------------------
      I           P           I           P           I           P           I           P
---------------------------------------------------------------------------------

   778.6         .06       761.6         .13       647.4         .09       609.3          .10
   473.9         .23       465.4         .16       404.1         .31       317.3          .25
   270.0         .45       251.8         .32       230.6         .41       184.1          .54
   169.3         .54       150.2         .46       115.1         .42       101.6          .56
    74.0         .52        71.1         .47        50.8         .47        47.4          .50
    37.7         .52        29.6         .45        21.6         .43        19.9          .56
    16.1         .41        14.4         .42         8.9         .26         8.3          .25
     5.5         .25         4.9         .23         3.6         .14         3.5          .14
     2.3         .08         2.1         .10         1.4         .04         1.1          .02
      .8         .00          .7         .04          .5         .00          .4          .00
      .4         .00          .3         .00


                                PARAMETER VALUES

        PS :      .62            ALPHA :      .044             BETA :     .0014

       (   .59,   .65 )         ( .040, .049 )              (  .0012,   .0016 )

  SAMPLE TEMPERATURE  2.5  C                 INCUBATION TEMPERATURE  -1.0 C


 CHLOROPHYLL :    2.36          RNA      :    9.14        PHOSPHATE    :     .80

 CARBON      :  308.00          DNA      :    3.63        NITRATE      :     .00

 NITROGEN    :     -            ATP      :    1.58        SILICATE     :    1.42

 PROTEIN     :  243.00          UREA     :     .10        AMMONIA      :     .55
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                                EASTERN ARCTIC 1980

LAT 73 40.00'N        LONG 76 59.00'W          DATE 20 08 80     DEPTH  40M
-------------------------------------------------------------------------------
   I             P             I             P             I             P             I             P
-------------------------------------------------------------------------------

854.7           .04     803.9           .04     727.8           .03     719.3           .03
664.3           .05     613.5           .10     592.4           .13     545.8           .10
473.9           .22     448.5           .35     334.3           .30     313.1           .41
275.0           .42     215.8           .47     184.1           .42      95.6           .49
 90.6           .55      65.6           .48      63.5           .58      61.4           .50
 36.8           .51      28.8           .47      26.2           .72      17.8           .72
 12.3           .58      12.3           .45       8.3           .38       8.0           .30
  6.1           .29       6.0           .26       3.7           .10       3.6           .17
  2.8           .11       2.8           .05       2.1           .07       1.9           .08
  1.4           .04


                                PARAMETER VALUES

        PS :       .68             ALPHA :      .063            BETA :     .0018

      (   .64,    .73 )          ( .056, .071 )            (  .0015,   .0021 )

  SAMPLE TEMPERATURE  -0.3 C                  INCUBATION TEMPERATURE  4.8  C


  CHLOROPHYLL :     1.13         RNA    :     1.26        PHOSPHATE   :    1.26

  CARBON      :    52.00         DNA    :      .96        NITRATE     :    5.64

  NITROGEN    :      -           ATP    :      .76        SILICATE    :   12.43

  PROTEIN     :    68.80         UREA   :      .53        AMMONIA     :     .75
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EASTERN ARCTIC 1980

LAT 73 40.00'N LONG 76 59.00'W DATE 20 08 80 DEPTH 40M

I	P	I	P	I	P	I	P
846.3	.16	761.6	.24	710.9	.13	647.4	.14
643.2	.37	567.0	.41	486.6	.55	482.4	.35
431.6	.51	334.3	.59	321.6	.45	230.6	.74
203.1	.81	143.9	1.01	131.2	.68	94.8	.83
79.5	.87	63.5	.75	53.7	.69	45.3	.65
38.5	.75	31.3	.63	27.9	.62	23.7	.75
16.5	.48	14.0	.67	12.1	.34	10.8	.32
8.4	.24	8.0	.19	5.8	.17	5.7	.25
3.1	.12	2.2	.03	2.1	.02	1.6	.02
1.5	.00	1.1	.05	1.1	.04		

PARAMETER VALUES

PS : 1.05	ALPHA : .038	BETA : .0021
(.98, 1.14)	(.034, .042)	(.0017, .0025)

SAMPLE TEMPERATURE -0.3 C INCUBATION TEMPERATURE 6.0 C

CHLOROPHYLL :	1.13	RNA :	1.26	PHOSPHATE :	1.26
CARBON :	52.00	DNA :	.96	NITRATE :	5.64
NITROGEN :	-	ATP :	.76	SILICATE :	12.43
PROTEIN :	68.80	UREA :	.53	AMMONIA :	.75

EASTERN ARCTIC 1980

LAT 73 40.00'N LONG 76 59.00'W DATE 20 08 80 DEPTH 40M

I	P	I	P	I	P	I	P
782.8	.01	719.3	.00	617.8	.06	613.5	.02
592.4	.09	490.8	.07	465.4	.11	372.4	.10
359.7	.20	323.7	.22	256.0	.13	232.7	.22
215.8	.26	179.8	.34	160.8	.34	143.9	.41
107.9	.45	94.8	.38	78.3	.41	67.7	.46
52.9	.45	49.9	.44	40.6	.52	32.2	.46
27.9	.43	21.6	.44	12.7	.32	12.3	.40
8.9	.25	8.7	.25	6.6	.19	6.1	.22
4.2	.14	3.8	.14	2.4	.14	2.3	.12
1.7	.08	1.3	.06	1.3	.11	1.1	.08
1.1	.05						

PARAMETER VALUES

PS :	.59	ALPHA :	.044	BETA :	.0023
(.56,	.62)	(.041,	.047)	(.0020,	.0025)

SAMPLE TEMPERATURE -0.3 C INCUBATION TEMPERATURE 1.6 C

CHLOROPHYLL :	1.13	RNA :	1.26	PHOSPHATE :	1.26
CARBON :	52.00	DNA :	.96	NITRATE :	5.64
NITROGEN :	-	ATP :	.76	SILICATE :	12.43
PROTEIN :	68.80	UREA :	.53	AMMONIA :	.75

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                              EASTERN ARCTIC 1980

 LAT 73 40.00'N       LONG 76 59.00'W         DATE 20 08 80     DEPTH  40M
----------------------------------------------------------------------------------
    I            P           I            P           I            P           I            P
----------------------------------------------------------------------------------

 740.5          .00       693.9          .00       592.4          .00       583.9          .00
 473.9          .00       431.6          .00       423.1          .00       292.0          .06
 275.0          .00       258.1          .05       186.2          .14       175.6          .21
 122.7          .25       118.5          .28        91.0          .28        69.8          .33
  59.2          .32        50.8          .40        36.0          .36        27.9          .33
  26.7          .36        19.0          .32         9.1          .28         8.3          .33
   5.1          .22         4.8          .15         3.3          .13         3.3          .07
   2.1          .06         2.0          .05         1.3          .00         1.3          .00
    .6          .00          .8          .00          .7          .00          .6          .00
    .5          .00          .4          .00


                              PARAMETER VALUES

         PS :      .64          ALPHA :     .034            BETA :    .0058

         (   .47,    .81 )      ( .027, .041 )          (  .0026,  .0089 )

   SAMPLE TEMPERATURE  -0.3 C                 INCUBATION TEMPERATURE  -1.5 C


  CHLOROPHYLL :     1.13       RNA       :     1.26        PHOSPHATE     :     1.26

  CARBON      :    52.00       DNA       :      .96        NITRATE       :     5.64

  NITROGEN    :      -         ATP       :      .76        SILICATE      :    12.43

  PROTEIN     :    68.80       UREA      :      .53        AMMONIA       :      .75
```

EASTERN ARCTIC 1980

LAT 75 47.20'N   LONG 79 27.00'W   DATE 21 08 80   DEPTH 26M

I	P	I	P	I	P	I	P
829.3	.14	803.9	.10	753.2	.12	668.5	.15
617.8	.14	609.3	.31	605.1	.21	507.8	.26
478.1	.33	457.0	.28	380.8	.36	315.2	.47
314.0	.41	262.3	.40	237.0	.58	220.9	.54
147.2	.66	139.6	.52	94.8	.51	91.8	.63
60.9	.48	60.5	.58	39.8	.54	33.4	.54
27.5	.57	26.2	.49	17.8	.35	17.8	.40
11.3	.38	10.6	.33	8.2	.23	8.2	.27
6.0	.35	5.7	.16	3.7	.10	3.4	.09
2.8	.07	2.8	.06	1.9	.04	1.9	.03
1.4	.01	1.4	.02				

PARAMETER VALUES

PS :	.72	ALPHA :	.037	BETA :	.0014
(.68,	.76)	(.033,	.040)	(.0012,	.0016)

SAMPLE TEMPERATURE -1.0 C   INCUBATION TEMPERATURE 3.0 C

CHLOROPHYLL :	2.89	RNA :	7.56	PHOSPHATE :	.96
CARBON :	126.00	DNA :	2.94	NITRATE :	4.73
NITROGEN :	21.00	ATP :	1.33	SILICATE :	8.04
PROTEIN :	173.20	UREA :	.24	AMMONIA :	1.26

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                              EASTERN ARCTIC 1980

 LAT 75 47.20'N       LONG 79 27.00'W        DATE 21 08 80    DEPTH  26M
--------------------------------------------------------------------------
     I          P          I          P          I          P          I          P
--------------------------------------------------------------------------

 833.6        .01     719.3        .23     702.4        .26     634.7        .43
 626.2        .43     575.5        .45     512.0        .61     486.6        .72
 473.9        .65     380.8        .89     330.0        .81     321.6        .75
 245.4        .82     228.5        .82     186.2        .78     148.1        .81
 120.6        .79     105.8        .77      82.1        .73      74.0        .67
  57.1        .92      55.0        .73      37.2        .75      35.5        .88
  25.0        .84      24.1        .64      15.2        .58      13.5        .58
  10.9        .42      10.7        .47       7.6        .29       6.6        .38
   5.0        .29       4.8        .26       2.7        .16       2.6        .15
   2.2        .08       2.1        .06       1.6        .00       1.1        .02


                              PARAMETER VALUES

       PS :      .96          ALPHA :      .058          BETA :      .0012

     (    .90,   1.02 )      ( .051, .065 )           (  .0009,   .0014 )

  SAMPLE TEMPERATURE  -1.0 C              INCUBATION TEMPERATURE  5.7  C


 CHLOROPHYLL :    2.89       RNA      :    7.56       PHOSPHATE   :     .96

 CARBON      :  126.00       DNA      :    2.94       NITRATE     :    4.73

 NITROGEN    :   21.00       ATP      :    1.33       SILICATE    :    8.04

 PROTEIN     :  173.20       UREA     :     .24       AMMONIA     :    1.26
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                              EASTERN ARCTIC 1980

LAT 75 47.20'N      LONG 79 27.00'W        DATE 21 08 80     DEPTH  26M
------------------------------------------------------------------------------------
   I            P         I           P          I           P         I           P
------------------------------------------------------------------------------------

 778.6         .04      710.9        .06      613.5         .16     600.8         .10
 541.6         .24      490.8        .22      431.6         .29     399.9         .43
 356.3         .30      302.5        .47      253.9         .38     247.1         .27
 165.9         .55      115.5        .51       82.5         .56      73.6         .45
  60.9         .55       53.7        .45       43.2         .41      41.9         .59
  30.9         .40       30.5        .34       21.2         .46      19.9         .28
  12.7         .35       11.4        .42        8.9         .20       8.4         .24
   5.8         .08        5.8        .15        4.7         .05       4.1         .09
   2.3         .03        2.3        .02        2.0         .00       1.2         .00
   1.2         .04         .8        .00         .8         .00


                                 PARAMETER VALUES

        PS :      .66            ALPHA :      .027           BETA :    .0014

       (   .59,   .72 )          ( .024, .031 )            (  .0011,   .0018 )

  SAMPLE TEMPERATURE  -1.0 C                   INCUBATION TEMPERATURE  1.5  C


  CHLOROPHYLL :    2.89       RNA      :     7.56        PHOSPHATE    :      .96

  CARBON      :  126.00       DNA      :     2.94        NITRATE      :     4.73

  NITROGEN    :   21.00       ATP      :     1.33        SILICATE     :     8.04

  PROTEIN     :  173.20       UREA     :      .24        AMMONIA      :     1.26
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                              EASTERN ARCTIC 1980

  LAT 75 47.20'N      LONG 79 27.00'W        DATE 21 08 80    DEPTH  26M
 --------------------------------------------------------------------------------
      I            P          I           P          I           P          I           P
 --------------------------------------------------------------------------------

  816.6          .03      765.9         .07     638.9          .08     609.3          .11
  541.6          .12      469.7         .18     452.7          .24     370.2          .18
  323.7          .36      311.0         .31     292.8          .35     209.0          .32
  201.4          .42      201.0         .32     143.9          .41     126.9          .39
  100.7          .55       91.8         .54      73.6          .48      61.8          .53
   51.2          .61       40.2         .36      30.9          .40      27.1          .36
   22.4          .52       16.1         .46      11.2          .24      10.4          .29
    8.4          .20        7.1         .28       5.8          .21       5.2          .19
    4.1          .17        3.6         .17       1.8          .07       1.8          .06
    1.2          .05        1.1         .03        .8          .04        .7          .02
     .6          .00         .5         .05

                              PARAMETER VALUES

          PS :       .61           ALPHA :      .039             BETA :     .0015

        (    .58,    .65 )        ( .035, .042 )            (  .0013,   .0018 )

   SAMPLE TEMPERATURE  -1.0 C               INCUBATION TEMPERATURE  -1.0 C


  CHLOROPHYLL :     2.89        RNA      :     7.56        PHOSPHATE    :      .96

  CARBON      :   126.00        DNA      :     2.94        NITRATE      :     4.73

  NITROGEN    :    21.00        ATP      :     1.33        SILICATE     :     8.04

  PROTEIN     :   173.20        UREA     :      .24        AMMONIA      :     1.26
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EASTERN ARCTIC 1980

LAT 75 47.20'N LONG 79 27.00'W DATE 24 08 80 DEPTH 1M

I	P	I	P	I	P	I	P
825.1	.40	770.1	.25	719.3	.31	710.9	.33
677.0	.53	655.9	.37	613.5	.34	482.4	.39
465.4	.45	435.8	.49	393.5	.55	283.5	.40
253.9	.46	245.4	.38	190.4	.39	177.7	.37
120.6	.38	98.2	.42	88.9	.32	65.2	.38
64.3	.40	46.5	.42	42.3	.44	32.6	.43
26.7	.42	23.7	.37	17.3	.22	16.1	.34
12.7	.20	12.7	.16	8.8	.19	8.7	.11
6.1	.08	5.6	.06	3.7	.03	2.6	.03
2.5	.00	1.9	.00	1.9	.01	1.4	.01
1.3	.01						

PARAMETER VALUES

PS :	.43	ALPHA :	.024	BETA :	.0001
	(.41, .46)		(.020, .027)		(0.0000, .0001)

SAMPLE TEMPERATURE 1.8 C

INCUBATION TEMPERATURE 3.0 C

CHLOROPHYLL :	1.68	RNA :	5.67	PHOSPHATE :	.67
CARBON :	199.00	DNA :	1.38	NITRATE :	.00
NITROGEN :	18.00	ATP :	-	SILICATE :	.50
PROTEIN :	180.10	UREA :	.83	AMMONIA :	.31

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                                    EASTERN ARCTIC 1980

  LAT 75 47.20'N      LONG 79 27.00'W          DATE 24 08 80     DEPTH    1M
----------------------------------------------------------------------------------
     I            P            I            P            I            P            I            P
----------------------------------------------------------------------------------

  761.6          .50        698.2          .87        622.0          .12        613.5          .78
  613.5         1.43        423.1         1.80        380.8         1.77        372.4         1.33
  270.8         1.73        270.8         1.57        228.5         1.84        156.6         1.64
  143.9         1.38        135.4         1.77        120.2         1.76        108.3         2.05
   86.7         1.68         69.8         1.57         61.4         1.94         44.0         1.67
   40.6         1.81         29.6         1.61         26.2         1.66         19.0         1.57
   18.2         1.58         10.6          .85         10.2          .82          7.1          .44
    6.3          .35          4.6          .14          4.1          .18          3.2          .84
    3.1          .26          1.8          .00          1.2          .26          1.2          .14
     .8          .00           .8          .00           .6          .00


                                    PARAMETER VALUES

           PS :      2.13            ALPHA :      .110              BETA :     .0027

         ( 1.97,  2.28 )            ( .094, .126 )               (  .0020,  .0034 )


   SAMPLE TEMPERATURE  2.0  C                  INCUBATION TEMPERATURE  3.0  C


  CHLOROPHYLL :      .79         RNA      :    8.27        PHOSPHATE    :      .52

  CARBON      :  140.00          DNA      :    2.84        NITRATE      :      .00

  NITROGEN    :   30.00          ATP      :     -          SILICATE     :      .56

  PROTEIN     :  239.80          UREA     :     .21        AMMONIA      :      .53
```

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                              EASTERN ARCTIC 1980

 LAT 78 19.30'N       LONG 74 54.90'W         DATE 25 08 80     DEPTH  10M
------------------------------------------------------------------------------
     I          P          I          P         I          P         I          P
------------------------------------------------------------------------------

 854.7        .21      820.9        .29     761.6        .23     732.0        .22
 617.8        .42      609.3        .43     600.8        .39     499.3        .35
 457.0        .64      423.1        .62     389.3        .70     317.3        .62
 249.6        .66      211.6        .58     162.9        .63     139.6        .74
 110.9        .65       72.8        .68      71.9        .69      55.9        .76
  55.0        .64       41.5        .67      39.8        .73      30.0        .61
  29.2        .57       18.6        .59      16.5        .53      14.0        .38
  12.1        .52        9.2        .37       9.1        .27       6.2        .20
   3.8        .11        3.8        .17       2.8        .03       2.7        .06
   1.9        .04        1.9        .04       1.4        .02       1.4        .04


                                PARAMETER VALUES

        PS :        .81           ALPHA :      .045             BETA :     .0010

        (    .77,    .85 )         ( .040, .049 )             (  .0008,   .0011 )

  SAMPLE TEMPERATURE   -0.8 C               INCUBATION TEMPERATURE   -0.5 C


 CHLOROPHYLL :     3.02         RNA      :     6.85         PHOSPHATE   :     1.00

 CARBON      :    91.00         DNA      :     1.02         NITRATE     :     6.45

 NITROGEN    :    23.00         ATP      :      .81         SILICATE    :    13.42

 PROTEIN     :   141.00         UREA     :      .25         AMMONIA     :      .19
```

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                                 EASTERN ARCTIC 1980

LAT 79 19.30'N       LONG 74 54.90'W        DATE 25 08 80    DEPTH  30M
---------------------------------------------------------------------------------
     I            P            I            P            I            P            I            P
---------------------------------------------------------------------------------

744.7           .42       685.5          .41      592.4          .54      571.2          .46
558.5           .73       457.0          .50      457.0          .68      389.3          .76
355.4           .72       304.7          .73      262.3          .79      237.0          .86
198.9          1.00       160.8          .89      154.4          .87      124.8          .75
105.8           .90        76.2          .72       55.0          .86       52.5          .92
 40.6           .70        39.8          .78       29.6          .75       27.5          .72
 20.7           .60        19.0          .58       12.1          .36       12.1          .53
  8.5           .32         8.3          .37        5.5          .25        5.4          .22
  4.1           .15         3.9          .15        2.3          .10        1.5          .03
  1.4           .00         1.0          .05        1.0          .06         .6          .06


                                 PARAMETER VALUES

          PS :      1.00          ALPHA :      .046          BETA :    .0010

          (    .95,  1.05 )       ( .042, .049 )          (  .0008,  .0012 )

   SAMPLE TEMPERATURE  0.0  C              INCUBATION TEMPERATURE  0.0  C


  CHLOROPHYLL  :    2.60       RNA     :     3.38       PHOSPHATE   :    1.02

  CARBON       :   65.00       DNA     :     1.26       NITRATE     :    6.85

  NITROGEN     :   10.00       ATP     :      .80       SILICATE    :   13.97

  PROTEIN      :  160.60       UREA    :      .15       AMMONIA     :     .23
```

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                          EASTERN ARCTIC 1980

 LAT 78 19.30'N      LONG 74 54.90'W        DATE 25 08 80    DEPTH  40M
----------------------------------------------------------------------------------
   I            P          I            P          I           P          I            P
----------------------------------------------------------------------------------

753.2         .34     702.4         .24     592.4         .25     558.5         .27
452.7         .25     444.3         .56     406.2         .47     368.1         .42
283.5         .79     224.3         .65     203.1         .85     165.0         .60
156.6         .68     121.0         .66     110.0         .63      81.7         .82
 76.2         .87      61.4         .89      59.2         .69      41.5         .80
 41.0         .65      32.2         .75      27.9         .58      23.3         .57
 17.8         .70      15.2         .48      11.6         .38       9.4         .27
  7.2         .18       6.6         .29       4.5         .17       4.2         .13
  3.0         .13       3.0         .09       1.5         .01       1.4         .07
  1.0         .01        .9         .02        .7         .00        .6         .02
   .5         .02        .5         .00


                          PARAMETER VALUES

        PS :       .94          ALPHA :      .044          BETA :    .0017

       (  .88,    .99 )        ( .039, .048 )          (  .0014,   .0020 )

  SAMPLE TEMPERATURE   0.0   C              INCUBATION TEMPERATURE   0.0   C


 CHLOROPHYLL :     2.02        RNA      :     3.94        PHOSPHATE    :     1.16

 CARBON      :    73.00        DNA      :     1.65        NITRATE      :     7.54

 NITROGEN    :     3.00        ATP      :      .63        SILICATE     :    14.76

 PROTEIN     :   108.10        UREA     :      .75        AMMONIA      :      .25
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                              EASTERN ARCTIC 1980

  LAT 79 46.60'N        LONG 69 27.40'W          DATE 26 08 80     DEPTH  10M
---------------------------------------------------------------------------------
     I             P          I           P         I            P        I            P
---------------------------------------------------------------------------------

  820.9           .21      710.9         .19      550.1          .22     528.9          .39
  457.0           .46      385.0         .49      355.4          .55     228.5          .62
  215.8           .65      154.4         .78      154.4          .67     110.0          .58
  109.2           .79       79.1         .59       75.7          .57      52.9          .65
   41.5           .64       38.1         .57       31.3          .66      25.4          .62
   22.4           .64       14.0         .57       13.5          .55       9.8          .52
    9.7           .46        7.5         .32        7.3          .33       5.4          .26
    5.3           .21        3.0         .14        2.2          .07       2.1          .07
    1.6           .03        1.5         .04        1.2          .01       1.1          .04


                                PARAMETER VALUES

            PS :       .76              ALPHA :      .062               BETA :     .0010

          (    .72,    .80 )           ( .056, .068 )               (   .0008,   .0012 )

    SAMPLE TEMPERATURE  -1.0 C                    INCUBATION TEMPERATURE  -0.5 C


  CHLOROPHYLL :    4.98          RNA     :      7.72         PHOSPHATE    :       .70

  CARBON      :  138.00          DNA     :      1.57         NITRATE      :       .18

  NITROGEN    :   16.00          ATP     :      1.37         SILICATE     :      4.92

  PROTEIN     :  310.90          UREA    :       .48         AMMONIA      :       .14
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                                 EASTERN ARCTIC 1980

  LAT 79 46.60'N        LONG 69 27.40'W         DATE 26 08 80     DEPTH  30M
--------------------------------------------------------------------------------
     I         P         I         P         I         P         I         P
--------------------------------------------------------------------------------

  787.0       .10      719.3      .17      622.0      .29      605.1      .18
  605.1       .18      486.6      .23      440.1      .31      359.7      .40
  351.2       .31      281.4      .45      232.7      .57      222.1      .46
  160.8       .39      148.1      .48      129.1      .53      106.2      .56
   85.9       .60       71.9      .46       57.1      .47       52.0      .52
   39.4       .49       37.2      .51       27.1      .51       26.2      .47
   19.5       .39       18.6      .29       12.7      .39       11.4      .33
    8.0       .27        7.5      .30        5.5      .18        5.4      .15
    4.1       .13        4.0      .16        2.4      .06        2.4      .07
    1.5       .07        1.4      .04        1.3      .01        1.2      .04
     .8       .03         .7      .02

                                 PARAMETER VALUES

          PS :       .62          ALPHA :      .037          BETA :    .0010

        (    .59,    .65 )      ( .034, .040 )          (  .0009,   .0012 )

   SAMPLE TEMPERATURE  -1.0 C                  INCUBATION TEMPERATURE  -0.5 C


  CHLOROPHYLL :    3.36       RNA      :    4.80      PHOSPHATE    :     .89

  CARBON      :  164.00       DNA      :    1.93      NITRATE      :    3.57

  NITROGEN    :   27.00       ATP      :    1.06      SILICATE     :   10.98

  PROTEIN     :  250.60       UREA     :     .63      AMMONIA      :     .29
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                                EASTERN ARCTIC 1980

 LAT 79 46.60'N        LONG 69 27.40'W         DATE 26 08 80     DEPTH  40M
-------------------------------------------------------------------------------
     I            P          I             P          I            P          I             P
-------------------------------------------------------------------------------

 803.9          .14     723.6           .13     622.0          .14     609.3           .12
 473.9          .22     473.9           .07     465.4          .11     347.0           .13
 211.6          .28     190.4           .29     186.2          .29     152.3           .22
 100.7          .35      99.0           .32      73.2          .39      67.7           .42
  50.8          .28      49.1           .36      40.2          .28      34.3           .33
  27.1          .24      22.8           .26      12.7          .29      11.9           .39
   7.7          .28       5.8           .17       5.4          .26       4.4           .14
   3.8          .13       1.9           .12       1.9          .14       1.2           .04
   1.1          .06        .8           .03        .8          .11        .6           .01
    .6          .02


                                PARAMETER VALUES

        PS :       .36          ALPHA :      .060              BETA :    .0006

       (   .33,    .38 )        ( .050, .069 )              (  .0005,  .0007 )

   SAMPLE TEMPERATURE  -1.3 C                  INCUBATION TEMPERATURE  -0.5 C


  CHLOROPHYLL :      .60       RNA      :    1.18         PHOSPHATE   :     1.43

  CARBON      :    33.00       DNA      :    2.10         NITRATE     :     8.16

  NITROGEN    :     6.00       ATP      :     .48         SILICATE    :    17.89

  PROTEIN     :    37.80       UREA     :     .74         AMMONIA     :      .24
```

Photosynthetically Active Radiation

(PAR)

Totals are Wm^{-2} for each hour ending at hour indicated. All times are ADT.

NO PAGE 138

	11/7	12/7	13/7	14/7	15/7	16/7	17/7	18/7	19/7	20/7	21/7	22/7	23/7
0100	-	0	0	0	0	0	0	0	0	0	0	0	0
0200	-	0	0	0	0	0	0	0	0	0	0	0	0
0300	-	0	0	0	0	0	0	0	0	0	0	0	0
0400	-	0	0	0	0	0	0	1	0	1	0	0	2
0500	-	0	0	0	2	1	7	17	16	14	6	4	9
0600	-	0	15	5	37	3	29	49	49	46	28	19	32
0700	-	13	11	24	120	14	66	122	88	72	66	46	70
0800	-	40	178	77	101	24	133	305	127	79	116	88	146
0900	-	65	290	174	84	53	217	365	112	168	196	158	182
1000	3	85	401	302	62	65	234	416	247	188	277	226	249
1100	3	72	490	405	112	142	287	229	253	170	419	436	257
1200	129	106	488	498	171	177	322	281	366	227	477	526	215
1300	310	89	235	527	169	218	387	366	407	212	384	534	221
1400	301	83	86	512	253	247	343	378	199	166	386	437	185
1500	232	45	77	349	57	216	211	369	125	115	344	333	93
1600	177	47	114	358	65	259	204	225	222	86	263	305	80
1700	99	24	91	324	156	214	204	133	153	55	148	179	49
1800	65	47	241	269	68	38	130	93	75	29	88	100	52
1900	36	23	153	135	21	28	46	65	43	12	46	40	38
2000	10	31	46	37	4	4	12	23	12	1	14	15	16
2100	2	3	6	1	0	1	1	1	1	1	1	2	10
2200	0	0	0	0	0	0	0	0	0	0	0	0	1
2300	0	0	0	0	0	0	0	0	0	0	0	0	0
2400	0	0	0	0	0	0	0	0	0	0	0	0	0

(CONTINUED)

CONTINUED

24/7	25/7	26/7	27/7	28/7	29/7	30/7	31/7	1/8	2/8	3/8	4/8	5/8	6/8
0	0	0	0	1	5	7	3	9	8	13	8	5	12
0	0	0	0	2	6	7	7	9	12	11	6	4	7
0	0	0	1	6	8	7	7	17	17	15	6	4	7
0	0	2	6	13	15	13	8	36	34	22	7	7	10
7	10	11	23	24	32	19	17	47	62	31	12	122	15
22	45	19	33	48	55	26	32	69	70	47	20	22	17
58	77	44	72	59	52	40	42	94	80	63	31	34	14
183	82	80	88	81	75	55	49	140	122	88	49	69	17
285	79	154	126	100	87	80	41	189	158	114	61	116	43
378	43	242	165	111	106	123	66	209	212	137	75	173	49
378	65	173	177	129	138	108	127	254	244	152	78	239	121
260	107	280	262	134	190	79	153	228	262	176	84	280	129
420	183	243	269	128	193	144	182	322	248	173	100	294	179
442	178	169	335	112	247	257	143	168	263	171	105	261	165
244	40	142	354	119	246	114	214	194	252	143	113	240	176
282	33	105	334	102	157	63	80	152	235	126	124	247	157
205	30	101	268	92	92	57	76	156	229	98	124	209	131
173	74	51	204	79	90	57	104	106	190	68	77	193	88
131	86	31	143	74	93	51	59	79	138	48	90	155	67
43	102	17	83	43	54	30	52	42	84	32	80	106	93
17	27	1	37	26	38	20	43	36	64	29	52	79	97
1	3	0	15	17	35	10	23	34	44	22	36	39	75
0	0	0	5	11	13	8	13	10	26	17	20	26	40
0	0	0	1	7	10	5	10	17	18	11	10	23	18

(CONTINUED)

NO PAGE
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CONTINUED

7/8	8/8	9/8	10/8	11/8	12/8	13/8	14/8	15/8	16/8	17/8	18/8	19/8	20/8
8	14	12	4	1	1	4	10	2	1	3	0	1	6
5	8	6	2	1	0	1	3	1	1	1	0	0	5
4	6	5	2	2	0	1	2	1	0	1	0	0	1
7	7	8	4	4	1	1	3	1	1	1	0	1	0
13	22	17	10	13	4	3	6	3	3	3	0	4	3
32	27	28	22	33	10	5	15	7	8	5	2	12	9
45	47	86	59	52	18	10	33	17	12	12	5	25	21
63	86	112	78	81	17	24	32	23	16	38	11	45	48
138	113	150	151	154	29	44	56	40	40	63	20	66	84
193	150	161	173	168	47	76	68	48	65	113	31	106	137
252	82	195	241	134	110	81	111	52	84	167	37	127	170
215	101	249	265	119	76	110	139	78	117	221	35	188	214
127	226	260	178	272	125	180	136	103	119	254	42	207	234
185	245	194	276	305	140	170	150	122	132	234	55	176	232
212	253	191	305	289	147	171	137	152	158	199	63	306	209
195	213	169	153	270	111	152	150	167	151	184	61	266	148
102	262	137	122	238	118	210	124	87	164	86	40	186	148
176	264	222	112	181	202	199	98	62	143	83	54	200	123
193	196	132	68	126	183	178	102	43	122	41	47	153	91
146	170	80	53	48	124	135	95	41	116	21	36	86	59
118	122	46	32	28	91	128	58	35	84	10	18	89	28
83	77	43	14	14	28	80	23	12	46	5	14	29	11
44	50	23	6	11	16	40	12	6	21	1	6	16	3
23	27	9	3	4	9	21	5	3	10	0	2	9	1

(CONTINUED)

CONTINUED

21/8	22/8	23/8	24/8	25/8	26/8	27/8
0	2	1	2	0	1	1
0	1	0	0	0	1	1
0	1	1	0	0	1	1
2	2	1	1	1	2	2
5	7	4	3	3	5	4
12	18	9	7	8	11	7
27	30	18	14	19	16	11
43	87	32	16	24	26	19
69	97	69	21	28	35	37
88	119	109	34	43	42	57
123	139	132	55	60	46	65
182	145	154	70	71	50	46
225	102	109	72	69	59	45
259	110	149	88	61	50	44
268	123	233	49	74	55	
250	108	208	34	66	46	
175	112	164	31	39	35	
133	76	124	22	34	26	
114	52	102	24	37	18	
84	33	69	17	15	18	
70	20	70	9	8	11	
39	14	48	5	11	7	
15	7	21	2	7	4	
6	2	6	1	3	1	

Total Incident Radiation

Totals are W m^{-2} in each hour ending at hour indicated. All times are ADT.

NO PAGE
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	12/7	13/7	14/7	15/7	16/7	17/7	18/7	19/7	20/7	21/7	22/7	23/7	24/7
0100	0	0	0	0	0	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0	0	0	0	0	0
0500	0	0	0	0	0	1	2	1	2	0	0	0	0
0600	0	0	0	3	0	9	30	33	23	9	7	17	22
0700	3	18	6	71	4	47	76	74	79	43	29	45	31
0800	15	110	37	191	18	91	195	118	97	101	68	106	113
0900	52	284	116	155	27	222	460	168	114	173	135	217	329
1000	76	409	272	94	67	301	548	148	271	302	235	279	493
1100	109	600	429	72	89	354	592	366	229	422	359	342	605
1200	87	730	631	180	192	401	316	358	244	646	684	368	532
1300	133	678	699	198	249	468	438	556	334	690	803	309	498
1400	111	311	786	253	295	580	548	564	299	562	790	306	587
1500	90	97	721	329	355	471	525	267	233	593	640	264	673
1600	44	98	509	69	299	298	541	163	208	517	504	103	308
1700	54	140	493	81	384	301	294	360	159	386	426	95	455
1800	25	174	493	230	285	307	179	202	110	202	244	57	305
1900	60	348	397	88	41	177	135	103	76	122	130	72	263
2000	24	219	195	24	32	58	94	58	38	64	49	41	271
2100	40	53	59	3	3	13	26	13	14	17	17	20	63
2200	1	2	0	0	0	0	0	0	1	1	1	14	20
2300	0	0	0	0	0	0	0	0	0	0	0	0	0
2400	0	0	0	0	0	0	0	0	0	0	0	0	0

(CONTINUED)

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CONTINUED

25/7	26/7	27/7	28/7	29/7	30/7	31/7	1/8	2/8	3/8	4/8	5/8	6/8	7/8
0	0	0	2	10	16	6	15	15	24	17	11	31	22
0	0	0	1	7	11	4	12	15	17	13	6	17	9
0	0	0	2	8	11	6	14	18	15	8	4	9	6
0	0	1	8	13	9	10	34	28	20	9	6	10	5
1	3	10	20	24	21	11	66	64	31	11	10	20	8
20	17	41	39	52	25	26	87	110	43	20	17	27	22
78	34	51	76	87	40	46	133	119	67	29	30	30	59
108	64	107	90	74	57	62	174	148	90	49	51	20	134
120	128	134	129	113	82	72	280	226	120	77	107	22	228
108	250	186	148	132	118	56	313	251	155	92	180	69	218
46	368	254	175	167	185	105	355	334	212	112	301	70	349
95	284	278	195	220	141	189	407	369	238	114	402	201	427
142	460	419	198	295	111	235	417	389	267	119	461	184	309
282	340	396	181	309	215	269	485	380	258	156	474	277	198
224	248	526	163	406	411	204	267	390	249	150	417	256	302
51	191	568	167	381	136	315	317	390	216	170	386	272	319
40	156	528	150	219	86	113	240	377	183	187	386	233	251
39	140	422	135	125	78	110	236	368	145	169	315	187	147
123	64	308	119	128	80	150	164	284	98	114	296	128	308
136	39	201	111	135	71	86	114	201	67	136	234	98	310
161	22	101	60	77	40	75	59	129	44	112	160	174	232
34	12	46	38	56	28	63	53	115	43	72	110	173	186
3	1	23	25	50	12	31	54	66	33	49	44	96	142
0	0	7	16	16	11	17	23	36	23	25	34	59	50

(CONTINUED)

CONTINUED

8/8	9/8	10/8	11/8	12/8	13/8	14/8	15/8	16/8	17/8	18/8	19/8	20/8
38	50	13	4	2	15	45	5	2	8	0	1	1
29	20	8	2	0	5	9	2	0	2	0	0	0
15	7	3	1	0	1	3	1	0	1	0	0	0
13	6	3	3	0	1	45	5	2	8	0	1	1
12	14	9	8	1	1	7	3	4	3	0	4	1
44	32	16	24	7	4	15	6	7	6	1	8	9
45	54	30	66	16	6	49	16	15	12	3	25	21
70	172	98	93	25	16	51	32	20	37	10	49	53
140	179	160	143	24	37	74	43	41	83	19	77	106
193	267	274	280	41	75	92	71	79	130	30	124	187
232	284	268	270	70	124	138	70	121	245	51	172	278
79	335	364	190	165	115	177	85	149	291	44	235	312
221	421	392	187	101	170	239	122	183	353	54	344	373
369	393	259	432	187	291	211	171	165	347	58	256	373
407	304	452	449	204	259	230	179	225	358	93	439	400
325	281	456	430	202	262	230	267	230	280	74	492	265
343	267	215	404	160	329	198	184	236	152	70	330	214
442	250	186	357	198	333	161	91	235	126	63	321	225
430	370	171	176	299	307	146	63	198	87	68	336	174
273	192	99	144	269	272	176	58	187	32	54	229	116
282	120	75	57	187	223	123	52	151	20	32	184	60
210	65	46	28	130	176	40	26	108	6	22	77	22
121	107	18	15	38	126	26	10	37	3	15	36	6
102	39	11	5	21	38	10	5	19	0	7	7	2

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CONTINUED

21/8	22/8	23/8	24/8	25/8	26/8	27/8
0	5	2	7	0	2	1
0	2	1	1	0	1	1
0	1	1	0	0	1	1
1	2	1	2	0	2	2
4	8	3	4	2	4	4
11	21	7	9	7	11	9
31	41	16	17	19	22	14
51	96	37	20	34	28	19
86	180	80	30	34	42	38
129	196	157	32	54	51	75
143	187	192	75	69	63	88
292	267	219	80	99	68	75
356	133	328	90	114	72	63
437	190	302	108	68	64	
463	184	300	93	96	62	
423	155	420	50	100	75	
340	184	247	45	73	48	
289	122	227	30	47	39	
178	103	176	31	52	29	
148	59	163	23	37	24	
113	33	112	18	14	24	
94	27	119	8	14	11	
31	13	62	5	15	9	
14	5	15	1	5	3	

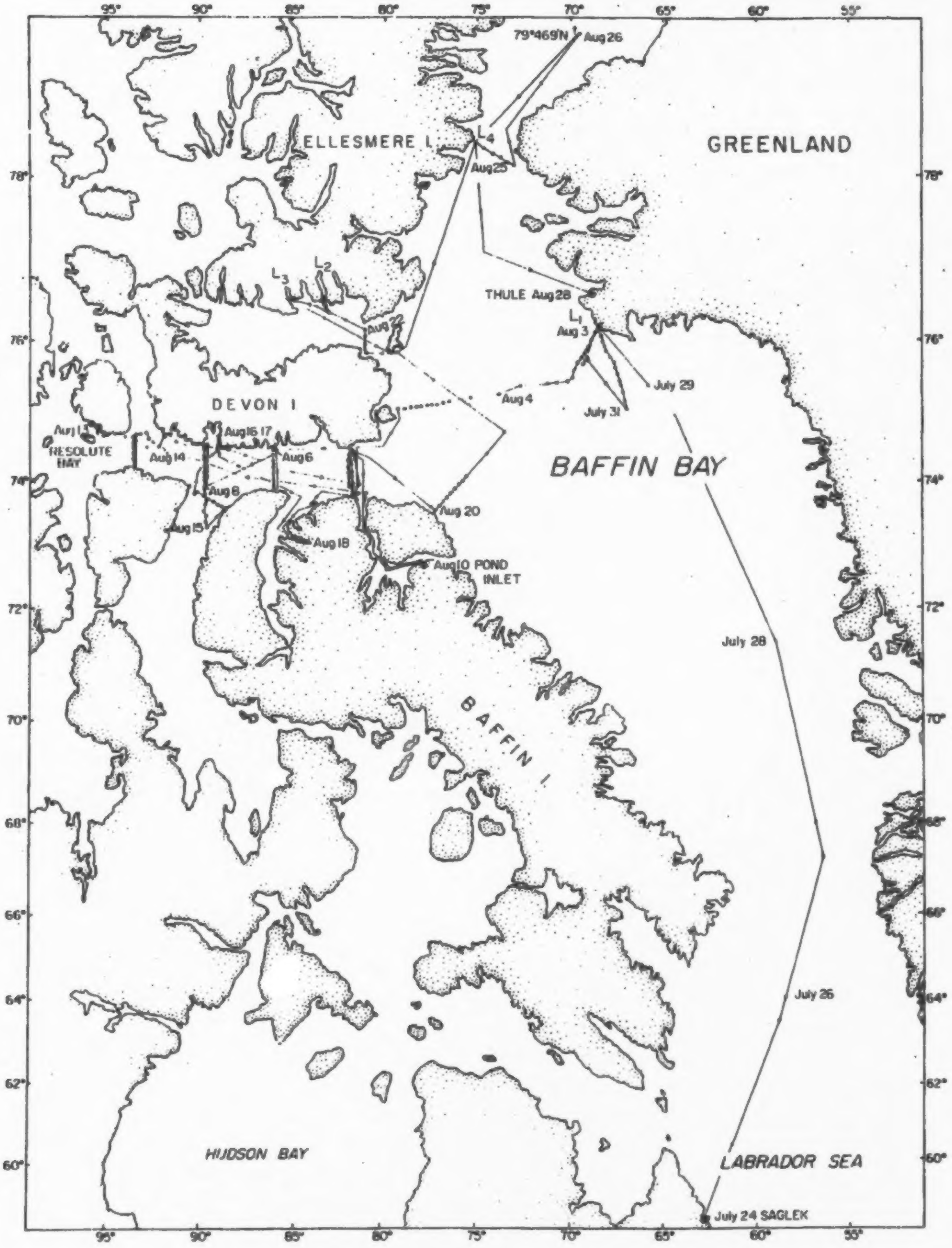
95°
90°
85°
80°
75°
70°
65°
60°
55°
79°46.9'N
Aug 26
ELLESMERE I.
L_4
Aug 25
GREENLAND
78°
L_3
L_2
THULE Aug 28
L_1
Aug 3
Aug 22
76°
DEVON I
Aug 4
July 29
July 31
Aug 13
RESOLUTE BAY
Aug 16 17
Aug 14
Aug 6
BAFFIN BAY
74°
Aug 8
Aug 20
Aug 15
Aug 18
Aug 10 POND INLET
72°
July 28
BAFFIN I.
70°
68°
66°
64°
July 26
62°
HUDSON BAY
LABRADOR SEA
60°
July 24 SAGLEK

Fig. 1. Cruise track of CSS Hudson from July 24 to August 28, 1980